

**EXHIBIT 12-a to PLAINTIFFS'
APPENDIX OF EXPERT REPORTS**

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**EXPERT REPORT OF GORDON SMITH
M.B., CH.B. (MD EQUIVALENT OTAGO UNIVERSITY), MPH**

August 3, 2020

RELATING TO

*Cabell County Commission and City of Huntington, West Virginia, (The Cabell Huntington Community) v.
AmerisourceBergen Drug Corporation, Cardinal Health, Inc., and McKesson Corporation,
No. 1:17-op-45053-DAP and No. 1:17-op-45054*

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Introduction

I am a physician epidemiologist at West Virginia University's School of Public Health. I am currently involved in multiple academic projects studying drug overdoses in West Virginia, including Cabell County. I have access to state and national databases that categorize and quantify fatal and non-fatal drug overdoses and other health impacts of the drug epidemic. I have been retained by Plaintiffs in this litigation to collect and evaluate data on the number of fatal and non-fatal overdoses in Cabell County.¹

Qualifications

I am the Stuart M. and Joyce N. Robbins Distinguished Professor in the Epidemiology Department of West Virginia University's (WVU) School of Public Health in Morgantown, WV. I am also an Adjunct Professor in the Emergency Medicine Department of WVU's School of Medicine. I have worked at WVU since 2016. From 2007 to 2016, I was a professor of epidemiology at the University of Maryland, Baltimore (UMB) School of Medicine. Prior to that, I worked at the Liberty Mutual Research Institute for Safety, an occupational injury research center affiliated with the Harvard School of Public Health, and before that at The Johns Hopkins School of Hygiene and Public Health (with joint appointments in Epidemiology and Emergency Medicine). At Johns Hopkins, I developed and directed a National Institute of Occupational Safety and Health-sponsored program to train doctoral students in occupational injury epidemiology and prevention and a co-director of an alcohol epidemiology training program that included other drugs of abuse.

I received my combined medical and undergraduate degree from the University of Otago

¹ I understand that the plaintiffs in this litigation are the Cabell County Commission and the City of Huntington. Most of Huntington lies in Cabell County, though a small portion is in Wayne County. For simplicity, because drug overdose data is organized county-by-county, the data in this report is limited to Cabell County.

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Medical School in New Zealand and a master's in public health from the Harvard School of Public Health. I trained at Wellington Hospital in New Zealand, Mater Children's Hospital in Australia and as an epidemic intelligence officer and preventive medicine resident at the Centers for Disease Control and Prevention (CDC), Atlanta. I began my public health career in Papua New Guinea where I worked for over four years both clinically and studying causes of death in a remote area of the country.

I have studied injury mortality, which includes drug overdoses, throughout my career and have considerable experience in injury and drug classification and coding systems. I was part of a World Health Organization committee that developed the latest revision of the International Classification of Diseases (ICD-10) codes for all injuries and poisoning which included expanding the codes for drug overdoses.

I was recruited to West Virginia in 2016 to strengthen the senior faculty at the university who are addressing the opioid problem and offered an endowed chair with resources to develop a research and training program on substance abuse epidemiology. I accepted the position at WVU because of the opportunity to work on drug overdoses in West Virginia, given how serious the issue is in this state, and because it was a logical extension of my earlier work on alcohol abuse. I am part of a group documenting substance abuse problems in West Virginia, looking at information such as autopsies (for fatal overdoses), hospital discharge data (for non-fatal overdoses), and conducting drug surveys in rural parts of the state. I am currently funded to conduct a field study of opioid related problems in the eight southernmost counties of West Virginia that are directly adjacent to Cabell County and Wayne County (where part of the City of Huntington lies). In addition, my statewide studies of drug overdoses have included both Cabell County and Wayne Counties. These southern WV counties have some of the worst drug

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overdoses rates in the state. The project involves geographic information system (GIS) mapping of overdoses, hepatitis C HIV and other complications of intravenous drug use.

One of the advantages of working in West Virginia is that I am very familiar with the multiple data sources on drug problems in the state and work with most of the people closely, interacting with them almost every day. I am currently directing the SUPPORT Needs assessment, which is documenting the overall impact of substance abuse in the state and conducting an extensive needs assessment. The SUPPORT project is funded by the federal Centers for Medicare & Medicaid Services (CMS) under the Substance Use Disorder Prevention that Promotes Opioid Recovery and Treatment for Patients and Communities (SUPPORT) Act that was enacted in October 2018. I am also very familiar with most of the drug studies done in the state and know most of the researchers personally.

Because of my experience and expertise in the field of injury research, I have received more than \$16 million in grants for my work, including support from the National Institutes of Health (“NIH”), Centers for Disease Control and Prevention (“CDC”), the Department of Defense, and the West Virginia Department of Health and Human Resources (WVDHHR). At UMB I was part of a university-wide, Shock, Trauma and Anesthesiology Research Organized Research Center (STAR-ORC) and the National Study Center for Trauma & EMS (NSC). I have directed large NIH funded grants on alcohol and injury fatality risk and have been conducting studies involving the UMB Shock Trauma Center trauma patients for many years with NIH and other support. At WVU, I am Associate Director of the Clinical Research Design, Epidemiology, and Biostatistics Core (CRDEB) of the NIH funded West Virginia University Clinical and Translational Science Institute (WVCTSI).

I have published over 200 peer-reviewed journal articles, including many articles on

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substance abuse of alcohol and other drugs, including opioids. I have a long history of working with medical examiners and working on toxicological studies of alcohol and other drug involvement in injury fatalities. Through my endowed funds, I have been funding the further development of our Forensic Drug Database that in collaboration with our medical examiner's office captures information on all drug overdoses and other injuries in the state. This work led to my co-authored article last year with WVU colleagues which described and analyzed the involvement of fentanyl and other opioids in drug-related deaths in West Virginia from 2005 to 2017.²

An important part of my work is mentoring young faculty and doctoral students in research, and I received the Faculty Mentoring Award from the Epidemiology and Human Genetics Program and Gerontology Program at the University of Maryland in 2016. To date I do not have any experience as a testifying expert but have been called upon to provide advice in a number of legal cases.

My *curriculum vitae* is included as Appendix A.

I am being compensated on an hourly basis for my work on this matter at a rate of \$500 per hour. I am also being reimbursed for my out-of-pocket expenses. My compensation does not depend on the outcome of the case or the substance of my opinions.

Summary of Opinions

In this report I present the following opinions and describe the evidence and analysis related thereto. The opinions in this report are based on information available to me at this time, and I reserve the right to supplement and revise the opinions expressed in this report based on additional information obtained after this report is submitted.

² "Fentanyl and fentanyl-analog involvement in drug-related deaths," Zheng Dai, Marie A. Abate, Gordon S. Smith, James C. Kraner, and Allen R. Mock, *Drug Alcohol Depend.* 2019 March 01; 196: 1–8.

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I have found that from between 2001 and 2018 at least 1151 people died of a drug overdose in Cabell County and 1,002 (87.1%) fatally overdosed on prescription or illicit opioids in the County. The rate of fatal overdoses has increased sharply over that time, from roughly 16.6/100,000 in 2001 to a high of 213.9 /100,000 in 2017. In the years 2001-2011, fatal overdoses due to prescription opioids such as oxycodone and hydrocodone significantly exceeded the rate of fatal overdoses due to illicit opioids, as more fully described in this Report.

I have further found that for West Virginia the drug poisoning rates, which are mostly due to drugs, had very low rates from 1979 until 2000 and began to increase dramatically from 2001 on, when they began to exceed the rate for the US as a whole.

Methodology

I have reviewed best available data to identify the numbers of drug overdose deaths in Cabell County and the State of West Virginia, and the drugs identified in those death cases, as described below. Based on my familiarity with the sources of the data, the methods in which they are compiled, and the personnel who have compiled the data, it is my opinion that the data provide a reliable basis to determine the numbers of overdose deaths and the drugs identified in those cases.

I am very familiar with the mortality data in West Virginia and the data we have on this in WV is of some of the highest quality in the country, especially for drug overdoses and information on the actual drugs involved. WV is one of a limited number of states with a comprehensive statewide medical examiner system that investigates all injury and suspicious deaths including overdoses. Local county medical examiners (ME) are called to investigate the scene, usually by police or hospitals.³ They are local physicians, nurses or EMTs with training in

³See <https://www.cdc.gov/phlp/publications/coroner/westvirginia.html>, for statutory authority.

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death scene investigation from the WV Office of the Chief Medical Examiner (OCME).

Following consultation with the OCME, heart blood samples are taken and sent with the report and the body to the OCME for forensic investigation, including autopsy and comprehensive tissue toxicology. The Medical Examiner (ME), after extensive investigation, records the full causes of death on the death certificate, which is forwarded to our WV Center for Health Statistics who process the information and forward it on to the CDC's SuperMicar nosology system that actually codes causes of death on certificates. The detailed toxicology analyses conducted by the ME enable the ME to write on the death certificate the names of all the drugs found to have contributed to the death. The Medical Examiner's Office data and the subsequent Vital Statistics data are reliable and widely used for governmental and academic purposes. In fact, WV is one of the top five states in the nation with regard to the coding and listing detailed drug involvement on the death certificate as documented by an article from one of my former students who is now working at the Mortality Branch of the National Center for Health Statistics, CDC.

I also work closely with the state Department of Health and Human Resources (DHHR), and I have access to detailed state Vital Statistics overdose fatality data for West Virginia from 2001 onwards. These data consist of detailed listings by year of the drugs found in all deaths that occur in the State, by county. These data are based on the same death certificates filled out in WV but are maintained in a separate database developed by the State to provide more timely data to track just overdoses. (WVDHHR special multiple drugs file). This database is maintained by the Health Statistics Center, is much more timely and is continually updated. Since 2001, the WVDHHR, Bureau for Public Health (BPH), HSC and Office of the OCME have collaborated to document drug-related overdose death data for each specific drug detected

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from toxicology results and recorded on death certificates. The data involved all manners of drug overdose deaths, including accidents, suicides, homicides and those of undetermined intent. This compilation of overdose deaths from death certificate data only include deaths that occurred in West Virginia. Information regarding deaths to West Virginia residents that occurred in other states was not included. The documentation and use of this data as described in the report up to 2015 are contained in the report, West Virginia Drug Overdose Deaths Historical Overview 2001-2015.⁴ This information is constantly updated as new information comes in and the data I have are current and accurate with final numbers up to 2018.

These data are more current and complete than the official statistics put out by the National Center for Health Statistics because there is an official cutoff date for submitting cases to NCHS. If the State has not finished the final investigation of deaths by this date WV would file it as an unknown cause (ICD-10 R99) and later update their own records. For example, DHHR reports 149 drug overdose deaths in WVDHHR special multiple drugs file, while a search of CDC WONDER from the National Center for Health Statistics for 2018 deaths found only 115 drug overdose deaths for Cabell County. This indicates that the more complete State database captured an additional 34 cases, presumably by including cases finalized after the cut-off date for CDC filing.

Following the methodology and using the data described above, I obtained fatal overdose data from Vital Statistics for Cabell County from 2001 through 2018 (displayed in Exhibit A to this Report). The West Virginia Medical Examiner's Office collects information on fatalities and sends it to Vital Statistics. The Medical Examiner's Office data and Vital Statistic data are

⁴ WV DHHR 2017 West Virginia Drug Overdose Deaths Historical Overview 2001-2015. August 17, 2017 DHHR Bureau for Public Health (https://dhhr.wv.gov/oeps/disease/ob/documents/opioid/wv-drug-overdoses-2001_2015.pdf):

reliable and widely used for governmental and academic purposes. The data show which drugs were recorded in decedents' system at the time of the Medical Examiner's autopsy, drawing from death certificates. Where multiple drugs were found in a decedent's system, each drug is separately counted, so the total number of drugs in the individual columns may be greater than the total number of fatal overdoses.⁵ The overdose data in Exhibit A are final, except that it is possible the 2018 numbers are considered "provisional" and could change slightly in an updated version.

Among the individual drugs listed in Exhibit A, heroin has no legal use, is not prescribed, and is always illicit.⁶ The other drugs, including fentanyl, are sometimes prescribed but sometimes misused or used illicitly. For the latter drugs, Exhibit A does not show whether each overdose was associated with prescription usage. However, it is generally accepted that prescription fentanyl (e.g., Duragesic patch) was the primary source of fentanyl overdose in the US prior to approximately 2013, and that illicit fentanyl has been the primary source of fentanyl overdose since that time.⁷ Data for Cabell County show that the illicit fentanyl wave arrived somewhat later, as the number of fentanyl overdose deaths varied from zero to six between 2001 and 2014, then jumped to 40 or greater in 2015 and thereafter.

Based on my academic research, I also have access to a more detailed large database of overdose fatalities from the West Virginia Medical Examiner's Office from 2005 onwards that

⁵ This is a standard practice and is also used by the CDC in its records of overdose mortality. In cases of multiple drug reports, it is reasonable to conclude that any opioid detected in the decedent's system contributed to the death, as the ME only writes drugs considered to have contributed to the death on the death certificate and due to the known toxic properties of opioids.

⁶ Schedule I drugs, substances, or chemicals are defined as drugs with no currently accepted medical use and a high potential for abuse. Some examples of Schedule I drugs are: heroin, lysergic acid diethylamide (LSD), marijuana (cannabis), 3,4-methylenedioxymethamphetamine (ecstasy), methaqualone, and peyote. <https://www.dea.gov/drug-scheduling>

⁷ <https://www.cdc.gov/drugoverdose/data/analysis.html>: "The third wave began in 2013, with significant increases in overdose deaths involving synthetic opioids, particularly those involving illicitly manufactured fentanyl."

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includes drug levels. Through my work with this database, I have become very familiar with the quality of the toxicology investigations done by the medical examiner and that it was of sufficient quality to use it in my own research. This is the same information that when listed on death certificates is used for compiling the detailed State Vital Statistics overdose fatality data.

The database we used for this research is described in my 2019 journal article:

A forensic drug database (FDD) was created in 2005 in collaboration with the West Virginia Office of the Chief Medical Examiner (WVOCME) to compile data from all WV drug-related deaths. West Virginia uses a centralized medical examiner system and the WVOCME maintains files for WV deaths. Drug-related death data are available from 2005 through 2017 Each FDD case includes demographic information (e.g., age, sex, race, weight, height, date of death, zip code of residence), cause and manner of death, toxicology findings (e.g., drugs identified, concentrations, postmortem interval), whether a prescription was present within the past 30 days for controlled substances, autopsy findings, and medical history. Sources used by the OCME data entry personnel to compile the FDD data included the death certificate, autopsy report, external examination, investigator reports, medical records, police reports, toxicology reports, the West Virginia Controlled Substances Monitoring Program (WV CSMP), and any other relevant information in the decedent's file. Medical history information was obtained using a variety of sources, including county MEs, scene investigations, prescription records, autopsy reports, and medical records when available.⁸

Opinion: Reliable Data Show that Prescription Opioid Deaths Significantly Exceeded Illicit Opiate Deaths in Cabell County During the Years 2001-2011, Followed by Increasing Deaths Identified with Heroin and Illicit Fentanyl.

Exhibit A shows the numbers of overdose fatalities in Cabell County from 2001-2018.

Column C of the Exhibit shows the number of overdoses, per year, that involve prescription or illicit opioids. During the early years of the opioid epidemic, there were more fatal overdoses due to a single opioid; however, as the epidemic progressed, more cases involved multiple

⁸Dai Z, Abate MA, Smith GS, Kraner JC, Mock AR. *Fentanyl and fentanyl-analog involvement in drug-related deaths. Drug Alcohol Depend.* 2019 Mar 1;196:1-8.

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opioids, as well as opioids plus drugs in other categories, such as benzodiazepines.

The data in Exhibit A show that fatal overdoses from heroin and fentanyl were few through 2012, but heroin overdoses began to increase steeply beginning in 2013, and fentanyl overdoses began to rise steeply in 2015, with the growing prevalence of illicit fentanyl. The data also show that overdoses from prescription opioids such as oxycodone increased during the early years and have remained relatively steady in number over the later years of the period from 2001-2017, with some decline noted in the provisional data for 2018. In the early years, a significant percentage of total overdoses came from opioids that were likely obtained through prescriptions, versus illicit sources, whereas in recent years heroin and illicit fentanyl are involved in a majority of opioid overdose deaths. The data therefore support the recognized transition from prescription to illicit opioids use, which has been documented in numerous peer-reviewed studies of the US population in general,⁹ and in Eric Eyre's recent book which describes how the same thing occurred throughout WV including in Cabell County.¹⁰ Figures 1 and 2, below, display the data from Exhibit A in graphic form, showing the dominance of prescription opioids in overdose mortality during the years 2001-2011, followed by increased occurrence of heroin and then fentanyl mortality in subsequent years:

Figure 1.

⁹ See, e.g., Muhuri PK, Gfroerer JC, Davies C. Associations of nonmedical pain reliever use and initiation of heroin use in the United States. SAMHSA; CBHSQ Data Review, August 2013; Cicero TJ, Ellis MS, Surratt HL, Kurtz SP. The changing face of heroin use in the United States: a retrospective analysis of the past 50 years. *JAMA Psychiatry*. 2014;71(7):821-826. doi:10.1001/jamapsychiatry.2014.366.

¹⁰ Eyre E. Death in Mud Lick: A True Story of Corporate Pill Pushers in Small Town America. Simon & Schuster, 2020.

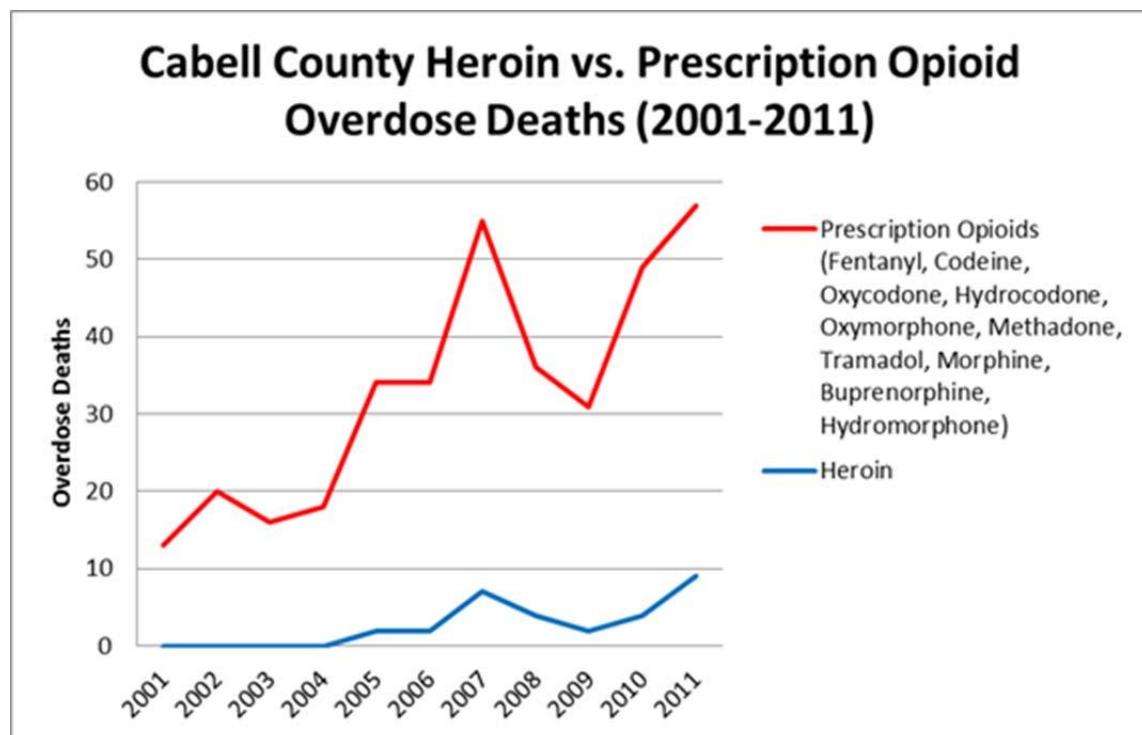
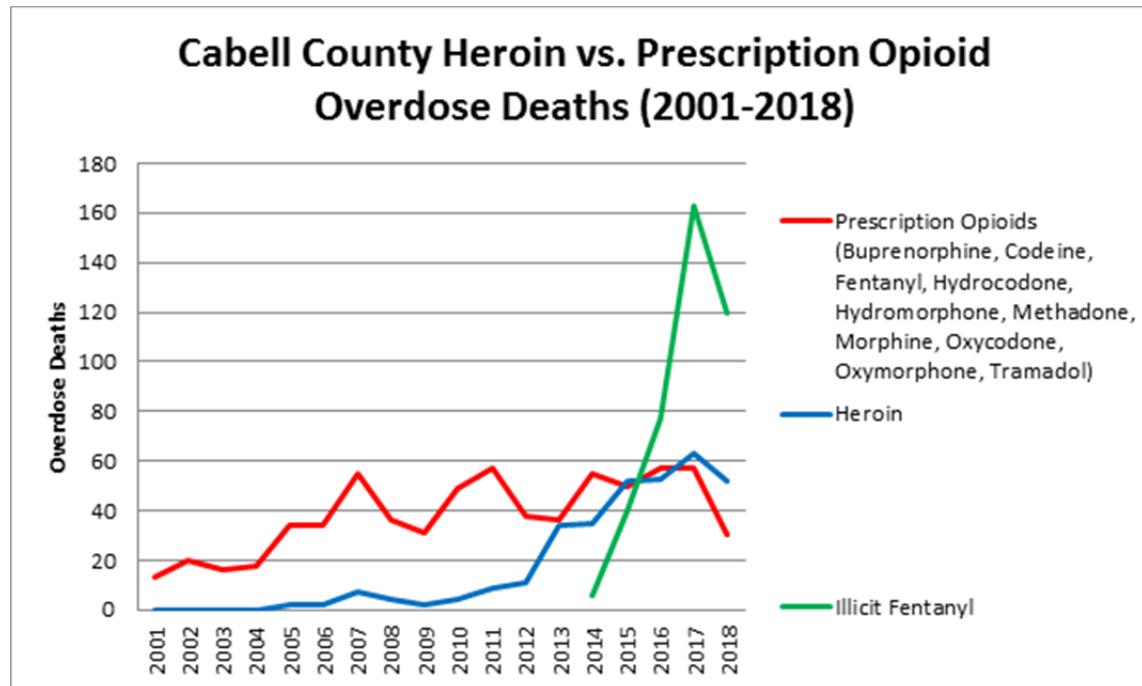


Figure 2.



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Opinion: Long Term Trends in Overdose Mortality Show Low and Stable Rates in West Virginia from 1979-1999, followed by Increased Rates Thereafter.

Prior to 2001, the WVDHHR did not collect the detailed drug data separately, and the available records lacked details of specific drugs involved in overdoses. The fatal overdose data did not specify which drugs were involved in each overdose. However for years prior to 2001, less detailed fatal overdose data is available from the National Center for Health Statistics. As with the more recent data, the source material on fatal overdoses comes from death certificate data gathered by the West Virginia Medical Examiner's Office. The difference is that prior to 2001, the state of West Virginia did not maintain its own separate, additional database of overdose data. West Virginia began maintaining its own database in 2001 because it saw that drug overdoses were increasing then and the State government wanted to have more easily-accessible data to understand the problem.

We used the National Center for Health Statistics CDC WONDER¹¹ database to examine trends in poisonings back to 1979. The currently used system for classifying drug overdoses is the ICD-10, which started in 1999, and we used this data for 1999 and 2000 data. Prior to this, deaths were coded in ICD-9 which ran from 1979-1998 (<https://www.cdc.gov/nchs/icd/icd9.htm>). The ICD-9 codes for poisoning were not as specific and the underlying cause codes did not allow separation of illicit drugs from prescription drugs.

Because the online database CDC WONDER suppresses numbers of deaths below a

¹¹ Centers for Disease Control and Prevention, National Center for Health Statistics. Underlying Cause of Death 1999-2018 on CDC WONDER Online Database, released in 2020. Data are from the Multiple Cause of Death Files, 1999-2018, as compiled from data provided by the 57 vital statistics jurisdictions through the Vital Statistics Cooperative Program. Accessed at <http://wonder.cdc.gov/ucd-icd10.html>.

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certain sample size¹², it was not possible to use it to obtain detailed data on the number of WV deaths for drug overdoses for 1979-1998 (<https://wonder.cdc.gov/cmfcicd9.html>). However, by search of the historical files, I was able to find copies of printed mortality rates but not numbers going back to 1978. The only code group for which 1988-1998 data were available was for all accidental poisonings combined (E850-E869 ICD-9) so to ensure consistency the same grouping was used for 1999-2018 (X40-X49 ICD-10). This was combined with online data in ICD-10 from 1999 to 2018, as displayed in Figure 3, below.

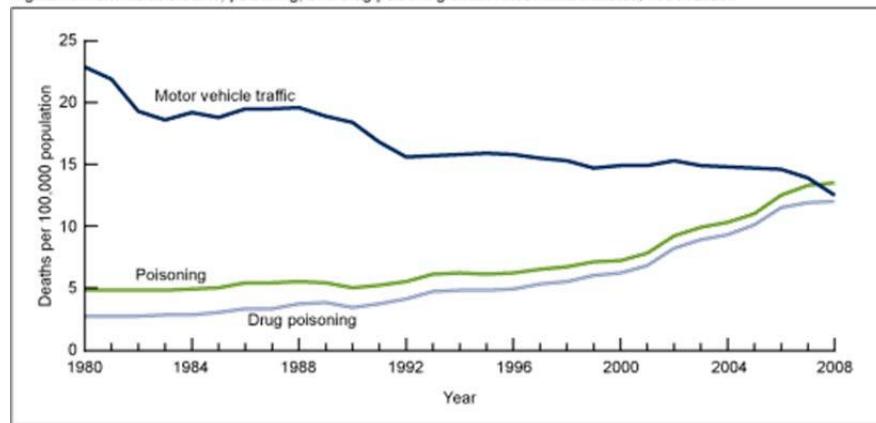
While we could not obtain long-term trend data for drug overdoses specifically for WV, accidental poisonings as a whole follow the same trend because the majority are due to drug poisoning as shown in the Figure 3 below from a study of drug poisoning deaths from 1980–2008 when compared to motorvehicle deaths¹⁰. Mortality from any type of poisoning started increasing in the US as a whole from about 1999-2000 (Figure 3), and by 2008 exceeded the number of motor vehicle traffic deaths.¹³ As can be seen, drug poisonings, (legal and illegal) are responsible for the major proportion of poisoning deaths, which exceeded motor vehicle deaths by 2008:

¹² Low numbers are suppressed because they are less reliable for calculating rates, and because of confidentiality concerns (i.e., when there are few deaths in a given locale, the identities of the decedents may be gleaned from the data).

¹³ Warner M, Chen LH, Makuc DM, Anderson RN, Miniño AM. Drug poisoning deaths in the United States, 1980–2008. NCHS data brief, no 81. Hyattsville, MD: National Center for Health Statistics. 2011. The author is a former student of mine, who now works on mortality at the National Center for Health Statistics.

Figure 3 [Previously identified as “Figure 1” in original article].

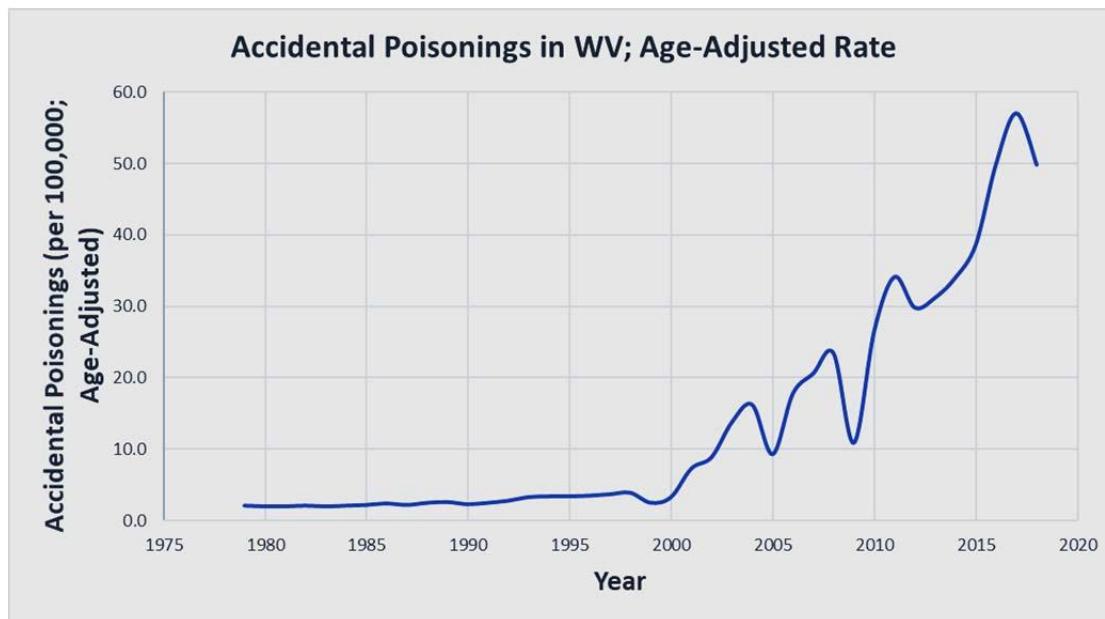
Figure 1. Motor vehicle traffic, poisoning, and drug poisoning death rates: United States, 1980–2008



Estimates are based on the National Vital Statistics System multiple cause of death mortality files. Deaths were classified using the International Classification of Diseases (ICD), Tenth Revision (ICD-10) in 1999 and ICD-9 prior to that.

The graph below (Figure 4) is based on official data from the National Center for Health Statistics using death certificate data at the date they closed their files. This includes all deaths to West Virginia residents and may include a small number of deaths where a WV resident died out of state. It also excludes deaths to residents of another state who could have overdosed in WV. It is generally considered that these numbers tend to cancel each other out. This shows that for West Virginia the age-adjusted drug poisoning rates, which are mostly due to drugs, had fairly stable and very low rates from 1979 until 1999-2000 which were all under 4/100,000 population. However, in 2001 the rate went up to 7.3 and began to increase dramatically from then on, reaching a peak of 57.0 in 2017. This is broadly consistent with the increasing rates in the US as a whole both for all poisonings and for drug poisonings as shown in the Figure 3, above. Because the rates remained low for *all* accidental poisonings in West Virginia from 1979-1999, it necessarily follows that opioid poisonings also remained low and stable during those same years.

Figure 4.



Opinion: Prescription Opioids Continue to Play a Major Role in Overdose Fatalities, Even after the Increased Incidence of Fentanyl and Heroin Mortality.

I am very familiar with most of the drug studies done in the State of West Virginia, and I work with most of the people closely and interact almost every day. There are two important studies done in West Virginia showing clearly that prescription opioids were very much part of the mix in West Virginia overdoses both in 2006 and more recently in an examination of 2016 overdose fatalities.

The study by Hall published in JAMA 2008 was¹⁴ the model upon which our Forensic Drug Database (described above) was based and his study was being conducted around the same time our Forensic Drug Database was becoming operational. CDC provided assistance to WVDHHR on issues relating to the increasing overdose rate in the State and to assist in investigating drug overdoses. This resulted in a publication examining patterns of abuse among unintentional pharmaceutical overdose fatalities. The investigators examined records of all State

¹⁴ Hall AJ, Logan JE, Toblin RL, Kaplan JA, Kraner JC, Bixler D, Crosby AE, Paulozzi LJ. Patterns of abuse among unintentional pharmaceutical overdose fatalities. JAMA. 2008 Dec 10;300(22):2613-20.

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residents who died from drug overdoses that occurred in the State during 2006. West Virginia is one of only a limited number of states that has a statewide centralized medical examiner system that investigates all deaths from injury and poisoning as well as any suspicious deaths. In addition, West Virginia has a prescription drug monitoring program (PDMP) that began in 2003¹⁵ and is called the Controlled Substances Monitoring Program CSMP).

First, death certificates for unintentional (“accidental”) drug overdoses (ICD-10 codes X40–X44) were identified. Of the 344 records examined, only 14.2% were excluded (10.2% were non pharmaceuticals such as illicit drugs, 3.5% were certified by county coroner or physician without autopsy and 0.6% had only a hospital blood screen but no definitive test). Thus, based on my calculations, of all the 330 drug overdoses with full ME testing, only 10.6% did *not* have any pharmaceutical drug in their system when they died. The investigators then matched records from the PDMP to determine if the decedent had any recorded prescriptions in the year before their deaths.

The most important finding from this in-depth study of all drugs found in those dying of unintentional drug overdoses was that in 2006 almost 4/5 of the overdose deaths involved prescription drugs (79.4%). In addition while the study noted that 63.1% were found to not have a documented prescription for drugs found (suggesting diversion), still 36.9% had active prescriptions for at least some of the drugs found in their blood when they died. In addition, 21.4% of all decedents had 5 or more clinicians prescribe them controlled substances in the year prior to death (i.e., doctor shopping). Opioid analgesics were found in 93.2% of all cases, although only 44.4% had any record of having ever been prescribed these drugs.

¹⁵ Hall AJ, Logan JE, Toblin RL, Kaplan JA, Kraner JC, Bixler D, Crosby AE, Paulozzi LJ. Patterns of abuse among unintentional pharmaceutical overdose fatalities. JAMA. 2008 Dec 10;300(22):2613-20.

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A similar study, conducted by colleagues at the Bureau of Public Health/WVDHHR,¹⁶ examined the 830 overdose deaths of West Virginia residents identified in preliminary 2016 data that were determined to be related to drug overdose. Deaths were linked to multiple data sources in the state including the West Virginia Board of Pharmacy's Controlled Substances Monitoring Program (CSMP), which documents the dispensing of schedule II-IV controlled substances. The study found: "91% of all decedents had a documented history within the CSMP. In the 30 days prior to death, nearly half (49%) of female decedents filled a controlled substance prescription in the 30 days prior to death, as compared to 36% of males. Opioids and benzodiazepines were the most common controlled substance prescriptions filled by decedents in the 12 months prior to their death."¹⁷ These data show that 10 years after the initial CDC study of 2006, prescription opioids were still a major factor in opioid overdose mortality in West Virginia.

Findings of the ASPPH Report (2019).

As a long-term public health professional at the West Virginia University School of Public Health, I fully concur with the November 2019 report from the Association of Schools and Programs of Public Health¹⁸ that outlines the public health approach to addressing opioids. Our school is an active member of that consortium, and one of my very close colleagues, Dr. Judith Feinberg, participated from our university in developing the report. It outlined clearly what is needed to heal communities devastated by the opioid crisis and the devastating impact the excessive promotion and marketing of opioids has had on society. The more I work on

¹⁶ West Virginia Violence and Injury Prevention Center. 2016 West Virginia Overdose Fatality Analysis: Healthcare Systems Utilization, Risk Factors, and Opportunities for Intervention. 2017. Available from: https://dhhr.wv.gov/bph/Documents/ODCP%20Reports%202017/2016%20West%20Virginia%20Overdose%20Fatality%20Analysis_004302018.pdf

¹⁷ *Id.*, at p. 4.

¹⁸ Association of Schools and Programs of Public Health. BRINGING SCIENCE TO BEAR ON OPIOIDS Report and Recommendations from the ASPPH Task Force on Public Health Initiatives to Address the Opioid Crisis November 2019, at p. 32. Available with Additional resources <https://www.aspph.org/opioids/>

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opioids in West Virginia the more I concur with the Task Forces conclusion that "*The opioid crisis can be directly tied to practices adopted and encouraged by opioid manufacturers and distributors. As such, the industry's credibility is near zero and major changes in its practices are essential.*"¹⁹

Conclusion

Based upon the data I have reviewed, it is apparent that prescription opioids were the primary cause of death in West Virginia between the years 2001-2011. Even as heroin and illicit fentanyl mortality has increased in more recent years, prescription opioids have continued to play a major role in the opioid epidemic in West Virginia. Until 1999, West Virginia had experienced a low and stable rate of drug overdose mortality for at least 20 years.

I declare under penalty of perjury that the foregoing is true and correct.

August 3, 2020



Gordon Smith, MB.ChB, MPH
Morgantown, WV

¹⁹ *Id.*, at 32.

Exhibit A

Cabell occurrence by year	All Drug Overdose Deaths	Opioid-Related Overdose Deaths	Buprenorphine	Codeine	Fentanyl**	Heroin	Hydrocodone	Hydromorphone	Methadone	Methamphetamine	Morphine	Oxycodone	Oxymorphone
2001	16	14	0	0	2	0	2	0	5	0	0	0	0
2002	23	20	0	0	4	0	2	0	8	1	4	0	0
2003	27	17	0	1	5	0	2	0	4	1	3	0	0
2004	27	17	0	1	5	0	0	0	10	2	0	0	0
2005	35	28	0	1	6	2	5	0	6	3	9	0	0
2006	40	30	0	0	4	2	5	1	6	6	10	0	0
2007	60	53	0	0	6	7	10	0	10	11	12	1	1
2008	40	34	0	0	5	4	8	0	6	0	14	1	1
2009	30	26	0	0	3	2	6	1	4	3	13	1	1
2010	47	41	1	1	1	4	13	1	4	3	20	4	4
2011	51	44	1	0	3	9	8	1	3	4	19	14	14
2012	39	30	1	1	0	11	7	0	4	5	10	6	6
2013	59	51	0	1	2	34	8	0	1	4	15	2	2
2014	70	62	4	5	6	35	14	0	4	9	13	2	2
2015	102	95	2	3	40	52	6	0	1	15	14	6	6
2016	134	122	5	3	77	53	7	0	3	24	13	1	1
2017	202	184	9	2	163	63	17	1	2	9	12	2	2
2018	149	134	5	3	120	52	4	1	2	8	6	0	0
Total	1151	1002	28	22	452	330	124	6	83	108	187	40	40

Cabell occurrence by year	Tramadol	Gabapentin	Alprazolam	Clonazepam	Diazepam	Cocaine	Ammphetamines	Methamphetamine	Amitriptyline	Citalopram	U-47700
2001	0	0	3	0	1	1	0	0	2	2	*
2002	1	0	1	0	2	3	0	0	1	3	*
2003	0	0	4	0	7	3	0	0	2	0	*
2004	0	0	4	0	6	10	0	0	1	3	*
2005	4	0	6	1	8	10	0	0	2	2	*
2006	2	0	6	0	9	8	0	0	2	0	*
2007	5	0	23	3	19	9	0	1	1	1	*

Cabell occurrence by year	Tramadol	Gabapentin	Alprazolam	Clonazepam	Diazepam	Cocaine	Ammphetamine	Methamphetamine	Amitriptyline	Citalopram	U-47700
2008	2	1	9	1	11	8	0	0	0	2	*
2009	0	0	10	0	4	6	0	0	1	4	*
2010	1	1	12	5	6	11	0	1	1	4	*
2011	4	2	13	4	14	11	1	0	2	2	*
2012	4	4	8	1	6	8	*	1	3	4	*
2013	3	3	15	4	4	13	*	3	4	6	*
2014	4	8	21	8	8	13	*	2	1	4	*
2015	3	9	27	6	16	20	*	4	2	3	*
2016	1	10	25	12	11	33	*	14	2	2	3
2017	3	6	22	9	18	47	*	44	2	1	4
2018	1	4	10	6	11	37	*	59	1	2	1
Total	38	48	219	60	161	251	1	129	30	45	8

Note: 1. amphetamine was stopped reporting in year 2012;
 2. u47700 was reported starting year 2016.

Exhibit B

Year	CrudeRate	Age Adjusted Rate/ 100,000 population
1979	2.1	2.1
1980	1.9	2.0
1981	2.0	2.0
1982	2.0	2.1
1983	2.0	2.0
1984	2.1	2.1
1985	2.2	2.2
1986	2.4	2.4
1987	2.2	2.2
1988	2.5	2.5
1989	2.6	2.6
1990	2.3	2.3
1991	2.5	2.5
1992	2.8	2.8
1993	3.3	3.3
1994	3.4	3.4
1995	3.4	3.4
1996	3.5	3.5
1997	3.7	3.7
1998	3.9	3.9
1999	2.5	2.5
2000	3.4	3.3
2001	7.2	7.3
2002	8.6	8.9



Exhibit B (continued)

Year	CrudeRate	Age Adjusted Rate/ 100,000 population
2003	13.1	13.8
2004	15.8	16.2
2005	9.0	9.3
2006	17.3	17.8
2007	19.6	20.6
2008	22.7	23.4
2009	10.7	10.9
2010	25.4	26.5
2011	32.0	34.1
2012	28.1	29.8
2013	29.6	31.2
2014	32.0	34.0
2015	36.6	38.6
2016	46.3	49.9
2017	52.9	57.0
2018	45.7	49.8

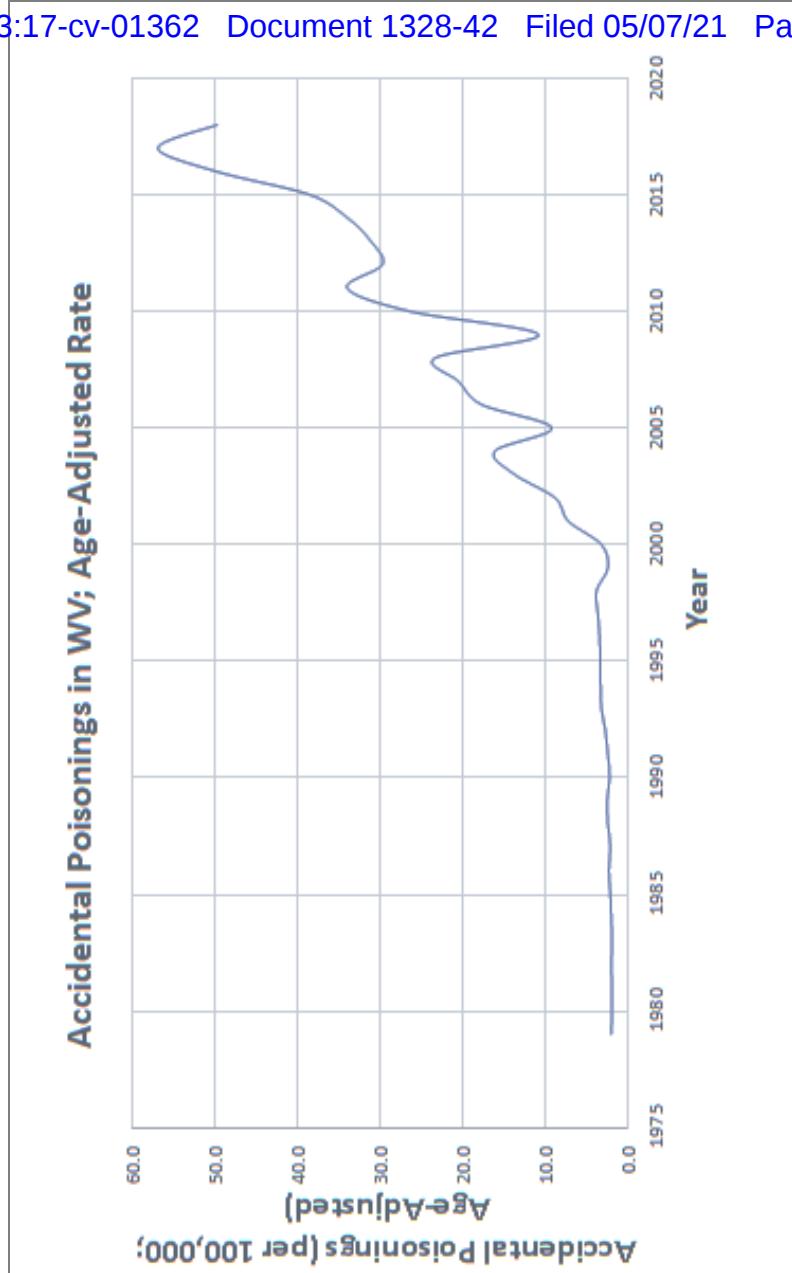


Exhibit C



**WEST VIRGINIA
DRUG OVERDOSE DEATHS
HISTORICAL OVERVIEW
2001-2015**

August 17, 2017



Bureau for Public Health
350 Capitol Street, Room 702
Charleston, West Virginia 25301

**WEST VIRGINIA
DRUG OVERDOSE DEATHS
HISTORICAL OVERVIEW
2001-2015**

Jim Justice
Governor

Bill J. Crouch
Cabinet Secretary
West Virginia Department of Health and Human Resources

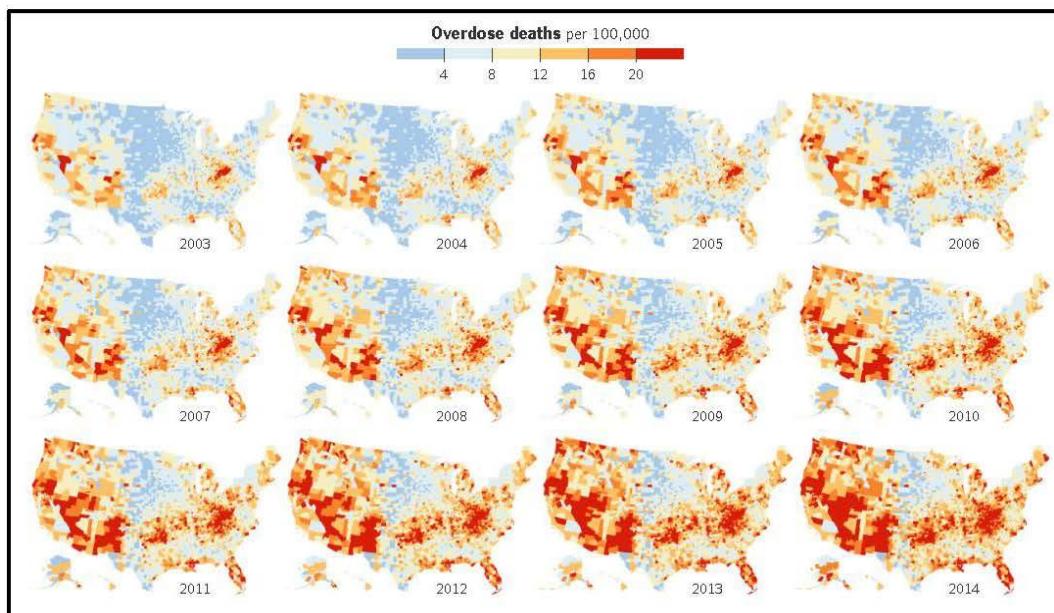
Rahul Gupta, MD, MPH, MBA, FACP
Commissioner, Bureau for Public Health
State Health Officer

West Virginia Drug Overdose Deaths (2001-2015)

On December 8, 2016, the Centers for Disease Control and Prevention (CDC) reported in the *Washington Post* that heroin deaths surpassed gun homicides for the first time. (www.washingtonpost.com/news/wonk/wp/2016/12/08/heroin-deaths-surpass-gun-homicides-for-the-first-time-cdc-data-show/?utm_term=.66ead0bf4c19) As recently as 2007, gun homicides outnumbered heroin deaths by more than 5 to 1. Opioid deaths continued to surge nationally in 2015, surpassing 30,000 for the first time. In 2015, there were 5,000 opioid deaths attributed to powerful synthetic opiates (fentanyl) creating an increase of 75% from 2014. Heroin deaths also spiked, rising more than 2,000 cases. For the first time since the late 1990s, there were more deaths due to heroin than traditional opioid painkillers, i.e. hydrocodone and oxycodone. Former CDC Director Dr. Tom Frieden stated, "Prescription opioid misuse and use of heroin and illicitly manufactured fentanyl are intertwined and deeply troubling problems. The epidemic of deaths involving opioids continues to worsen."

Figure 1 demonstrates the public health epidemic of drug overdose deaths across America.

Figure 1: How the Epidemic of Drug Overdose Deaths Rippled Across America



Source: New York Times (January 19, 2016)

In 2016, the U.S. Surgeon General released a report, "Facing Addiction in America," to address substance use problems in the United States and to help inform policy makers, healthcare professionals, and the general public about ways to reduce substance misuse and related problems. Strategies for early intervention will be needed to improve the availability of treatment. A public health model addressing substance misuse was available in this report for working towards a healthy community. The U.S. Surgeon General's report also discussed substances including alcohol, illicit drugs (prescription drugs used for nonmedical purposes) and over-the-counter-drugs (www.addiction.surgeongeneral.gov/surgeon-generals-report.pdf).

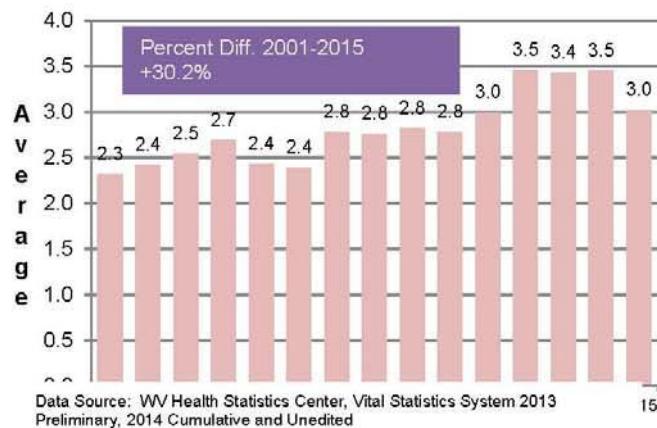
A public health epidemic of opioid drug overdoses has been worsening in the United States since the 1990s (www.cdc.gov/mmwr/preview/mmwrhtml/mm6043a4.htm). In 2014, opioids were involved in greater than 60% of overdose deaths and more Americans died of drug overdoses than in any previous year. The proportion of overdose deaths due to opioids is increasing with the largest percentage increases due to heroin and synthetic opioids, especially fentanyl. West Virginia had the highest overdose death rate of any state in 2013 and 2014 with the rate increasing 10.2% in that interval. However, the public health impact of non-fatal overdose deaths has not been widely studied. (www.cdc.gov/mmwr/preview/mmwrhtml/mm6450a3.htm)

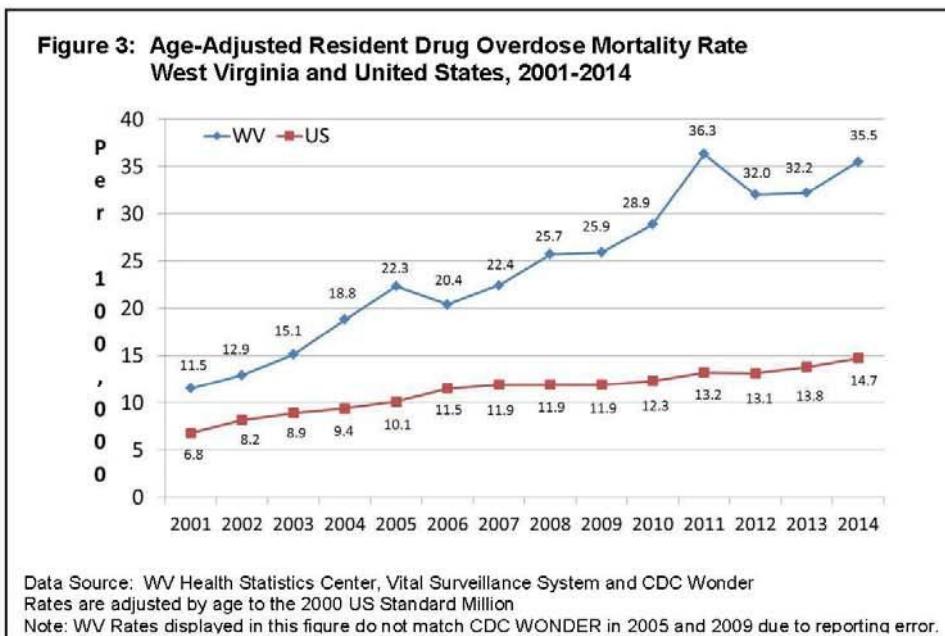
Due to the fact that most drug overdose deaths involved multiple substances (polypharmacy), each individual death usually involved multiple types of drugs. Thus, the West Virginia Health Statistics Center (HSC) prepared a review of each overdose death occurring in West Virginia according to available toxicology results. In 2001, there was an average of 2.32 drugs involved in each overdose death occurring in West Virginia. The HSC's last review of data was in 2015 (Figure 2) and indicated approximately 3.5 drugs were involved in each fatal overdose. Figure 2 displays an overall increase of 48.7% or an average increase of 3.5% per year occurring from 2001 through 2015.

The HSC made 15 years of data (2001-2015) available for review on October 14, 2016, and five years of race/ethnicity data on November 18, 2016, that reported the demographics of 7,207 drug overdose deaths in West Virginia (Figure 3). Since there were multiple occurrences of different drugs related to these trends, more detail about specific drug toxicology results will follow in this report. Prior to 2012, drug overdose deaths were predominately due to prescription drugs, such as methadone and oxycodone, being used for nonmedical purposes. Since 2013, the trend has shifted to selected opioids and injected heroin, some laced with fentanyl, carfentanil, and benzodiazepines.

West Virginia has been experiencing a public health epidemic of drug overdose deaths for more than a decade. Intentional and unintentional drug overdoses affect more densely populated areas of the state, as well as more rural southern areas. West Virginia drug overdose death rates compared to the United States are displayed in Figure 3. Since United States data are only available through 2015, the comparison in Figure 3 indicates the West Virginia resident drug overdose mortality rate of 35.5 is more than twice as high as the United States mortality rate of 14.7 per 100,000. West Virginia has the highest age-adjusted mortality rate in the nation and over a third higher than the next highest state, Kentucky. These rates in Figure 3 are adjusted by age to the 2000 U.S. Standard Million.

Figure 2: Average Number of Drugs Involved Per Fatal Overdose West Virginia Occurrences, 2001-2015



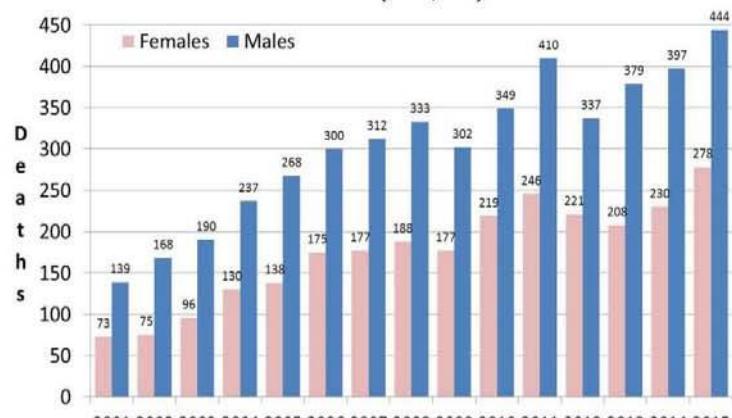


The information in this report was provided from multiple data sources available within the West Virginia Department of Health and Human Resources (WVDHHR). The interpretation of these resources will be displayed and discussed to fully characterize these data. Since 2001, the WVDHHR, Bureau for Public Health (BPH), HSC and Office of the Chief Medical Examiner (OCME) have maintained a collaboration of documenting drug-related overdose death data for each specific drug detected from toxicology results and recorded on death certificates. The data involved all manners of drug overdose deaths including accidents, suicides, homicides and those of undetermined intent. The death certificate data only includes deaths that occurred in West Virginia. Information regarding deaths to West Virginia residents that occurred in other states was not included. The 2015 data is preliminary and unedited; it may increase once all causes of death are known and coded. Other drug related overdose information was made available by the WVDHHR Bureau for Behavioral Health and Health Facilities (BBHF) in 2013 with the publication of a Substance Abuse Epidemiological Profile. This profile reported West Virginia rates for drug abuse and dependence as higher than the national average with an increase in the use of needles to inject any illegal drug and heroin (www.dhhr.wv.gov/bbhf/resources). This profile also reported that West Virginia's unintentional drug overdose deaths were 31.8 per 100,000 population while the national rate was 12.3 per 100,000. The number one cause of drug overdose deaths was associated with opiates, making West Virginia number one in the nation.

The remainder of this drug overdose report will focus on 15 years of West Virginia data for the following drugs: cocaine, methamphetamines, and prescription-type medications that are used for nonmedical purposes, i.e., pain killers (synthetic, non-synthetic opioid medications, fentanyl, oxycodone, and hydrocodone, heroin, and gabapentin); tranquilizers, including benzodiazepines; alprazolam; stimulants; and methamphetamine including amphetamines.

In Figure 4, the pattern of drug overdose deaths across the last 15 years by gender documented more male deaths than female deaths among the 7,207 drug overdose deaths that occurred. From 2013 through 2015 there is a similar increasing three-year trend among both genders.

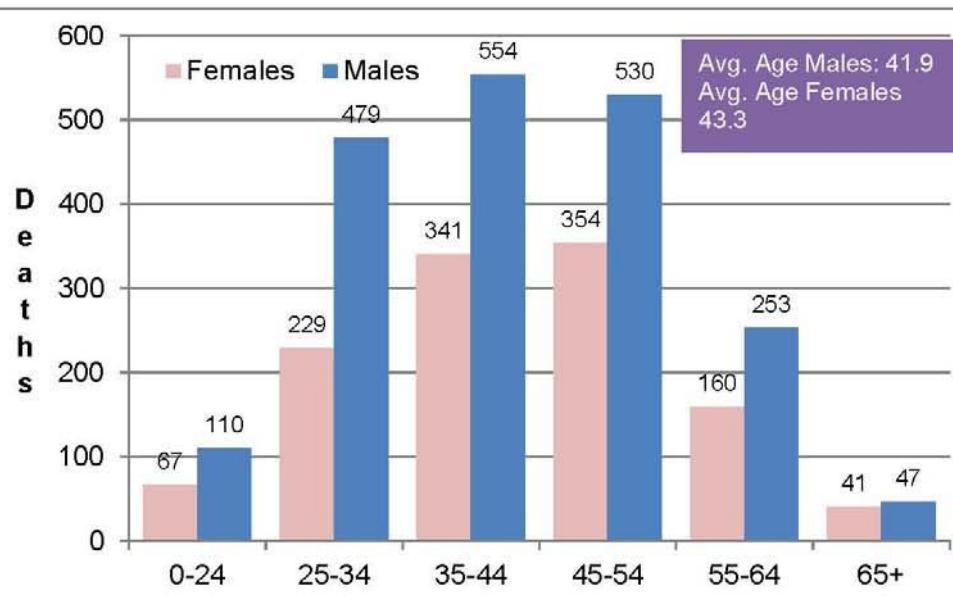
Figure 4: West Virginia Drug Overdose Deaths by Year & Gender 2001-2015 Occurrences (N=7,207)



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

The pattern of many more drug overdoses among male deaths than female deaths holds true for all age ranges. In the 0-19 and 60+ age groups, drug overdose deaths were practically the same among males and females. The average age at death, for both men and women, was 42 years old. Most drug overdose deaths occurred in the 30-39 and 40-49 age ranges for both males and females (Figure 5).

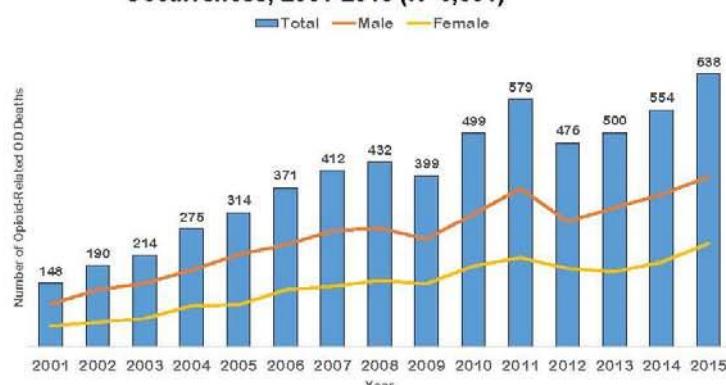
Figure 5: West Virginia Drug Overdose Deaths by Age-Group and Gender 2011-2015 Occurrences



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Opioids were detected in 6,001 drug overdose deaths in West Virginia from 2001 through 2015 (Figure 6). Over the last four years (2012-2015), an increasing trend was observed in Figure 6 with more overdose deaths among males than females.

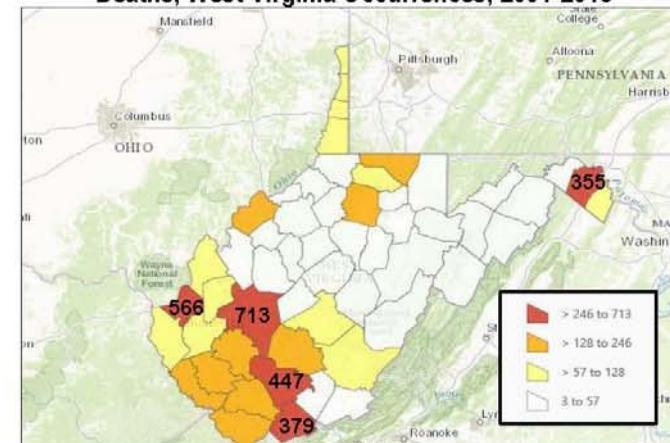
Figure 6: Opioid-Related Overdose Deaths, West Virginia Occurrences, 2001-2015 (N=6,001)



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Figure 7 maps the location of opioid overdose deaths by county of occurrence. The counties most impacted were Kanawha, Cabell, Raleigh, Mercer and Berkeley, accounting for 41% of reported opioid-related deaths (with at least one opioid per death) from 2001 through 2015. The cluster of deaths is concentrated in the southwestern part of the state, with exception of Berkeley County.

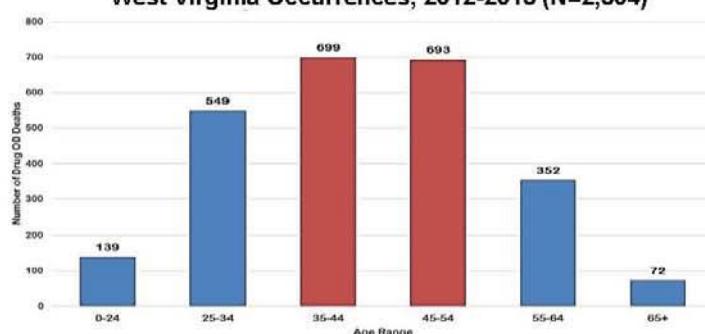
Figure 7: County-Level Distribution of Opioid-Related Overdose Deaths, West Virginia Occurrences, 2001-2015



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Figure 8 displays the total overdose deaths of 2,504 by age range from 2012 through 2015. The 35-44 and 45-54 age ranges are the most heavily impacted age ranges for these deaths that occurred from prescription opioid pain relievers.

Figure 8: Total Drug Overdose Deaths by Age Range West Virginia Occurrences, 2012-2015 (N=2,504)*



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Table 1 lists all of the opioids recorded on death certificates detected on toxicology results from 2001 through 2015. Table 1 includes a line item, "at least one opioid," which combines three 5-year clusters (2001-2005; 2006-2010; and 2011-2015). A net increased occurrence of opioid deaths was noted in these three aggregate periods. This increasing trend detects the concern that opioid overdose deaths are increasing with time. Due to the fact that most drug overdose deaths involve multiple substances (polypharmacy), any individual death may involve multiple types of drugs. As such, overdose deaths presented that involve one particular drug are rarely mutually exclusive from other overdose deaths, e.g., a death that may be heroin-related may also be a death that is hydrocodone-related (or alprazolam-related, or oxycodone-related, etc.). Because of this, the cumulative total for the rows below for individual drugs will not equal the 6,001 deaths listed in the "Total" column for the "At least 1 Opioid" row.

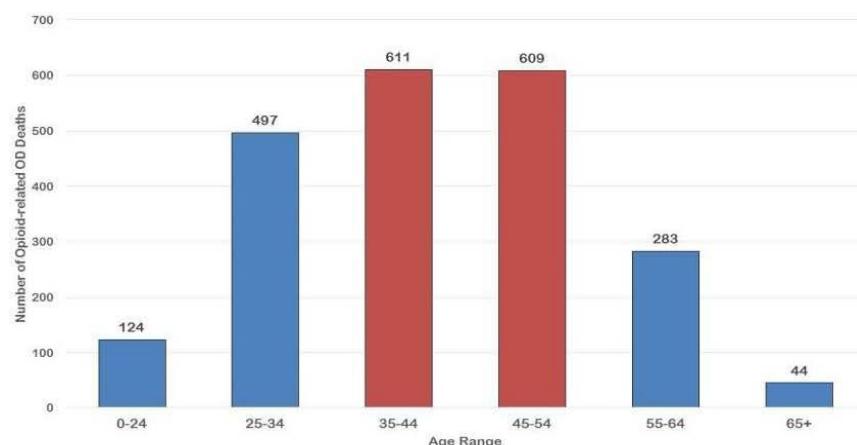
Table 1: Opioids Recorded on West Virginia Death Certificates, 2001-2015

Opioid	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Buprenorphine	0	0	0	0	0	0	0	5	5	12	15	32	30	34	31	164
Codeine	6	5	8	18	11	12	9	10	9	11	11	10	5	16	17	158
Fentanyl	9	17	36	46	54	39	60	57	49	44	51	32	40	55	180	769
Heroin	9	7	5	10	14	11	22	38	38	34	41	67	157	165	201	819
Hydrocodone	31	33	53	44	61	87	72	86	97	138	171	142	138	133	113	1399
Hydromorphone	1	1	0	5	2	4	6	7	11	6	14	9	12	11	8	97
Morphine	11	20	26	38	50	62	68	48	43	39	45	54	48	68	76	696
Methadone	39	83	71	116	120	141	109	95	78	83	61	65	55	39	32	1187
Oxycodone	39	49	45	47	58	82	112	140	141	223	224	182	200	200	182	1924
Oxymorphone	0	0	0	2	0	1	6	14	17	77	182	72	32	48	54	505
Propoxyphene	26	23	19	26	27	26	36	22	19	27	2	0	0	2	0	255
Tapentadol	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	1
Tramadol	2	2	1	6	11	11	17	24	16	25	35	32	37	42	22	283
At least 1 Opioid	148	190	214	275	314	371	412	432	399	499	579	476	500	554	638	6,001

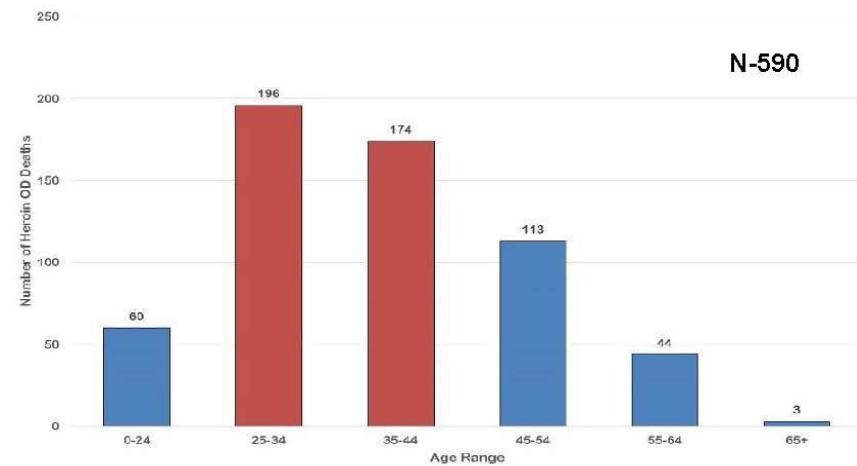
Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

The spike in reported heroin overdose deaths in West Virginia occurred in 2013 and continues to increase. Heroin-related overdose deaths were second only to 582 oxycodone-related deaths over the last three years (Table 1).

The next three figures compare West Virginia's 2012 through 2015 total of 2,168 opioid-related overdose deaths (Figure 9) with the 590 heroin-related overdose deaths (Figure 10) and 765 oxycodone-related deaths (Figure 11). From 2012 through 2015, most heroin deaths occurred among a younger age range (25-34 with 196 deaths, followed by 35-44 with 174 deaths) than total opioid overdose deaths (35-44 with 611 deaths, followed by 45-54 with 609 deaths) and oxycodone-related overdose deaths among an older age range (45-54 with 258 deaths).

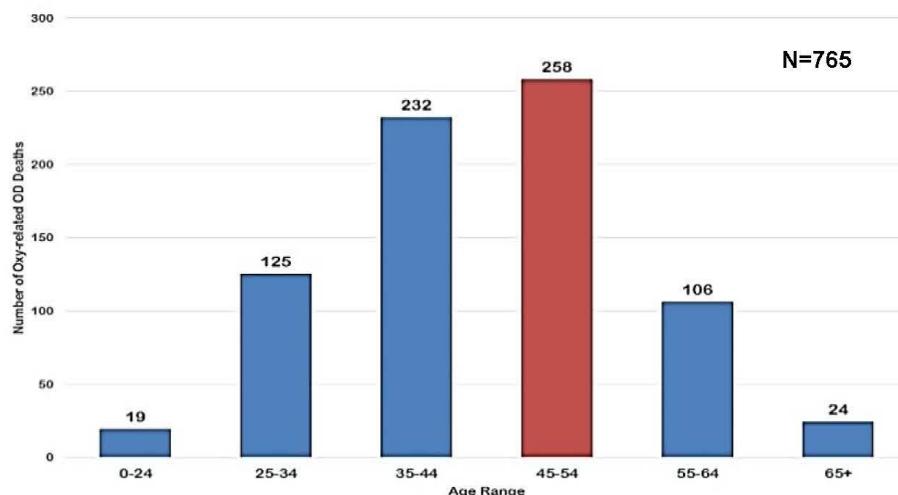
Figure 9: Opioid-Related Overdose Deaths by Age in West Virginia Occurrences, 2012-2015

Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Figure 10: Heroin-Related Overdose Deaths by Age in West Virginia Occurrences, 2012-2015

Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

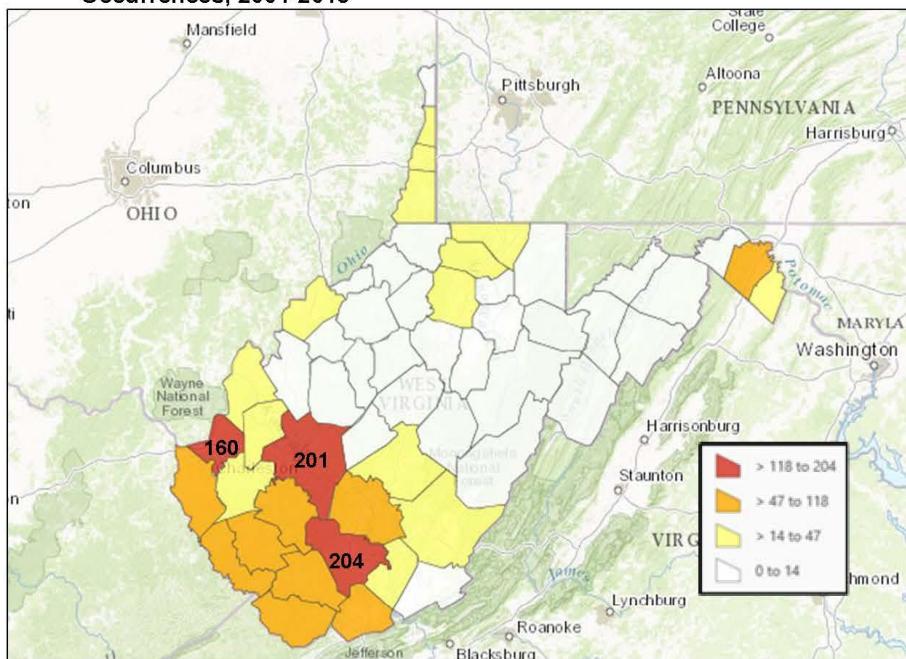
Figure 11: Oxycodone-Related Overdose Deaths by Age in West Virginia Occurrences, 2012-2015



Data Source: WV Health Statistics Center, Vital Statistics System, 2015 Preliminary Data

Raleigh, Kanawha, and Cabell counties accounted for 29.4% of reported deaths from oxycodone from 2001 through 2015 (Figure 12).

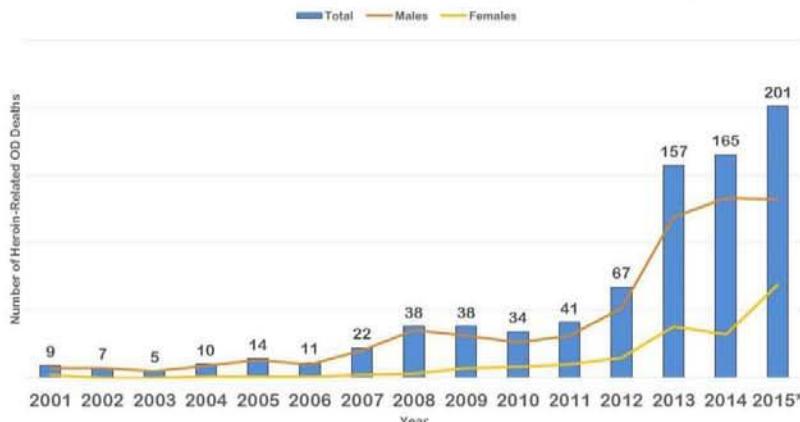
Figure 12: County-Level Distribution of Oxycodone-Related Overdose Deaths West Virginia Occurrences, 2001-2015



Data Source: WV Health Statistics Center, Vital Statistics System, 2015 Preliminary Data

819 heroin-related deaths were reported over the last 15 years (Figure 13). In more recent years, 2013 through 2015, heroin has become the second leading opioid contributing to 523 overdose deaths.

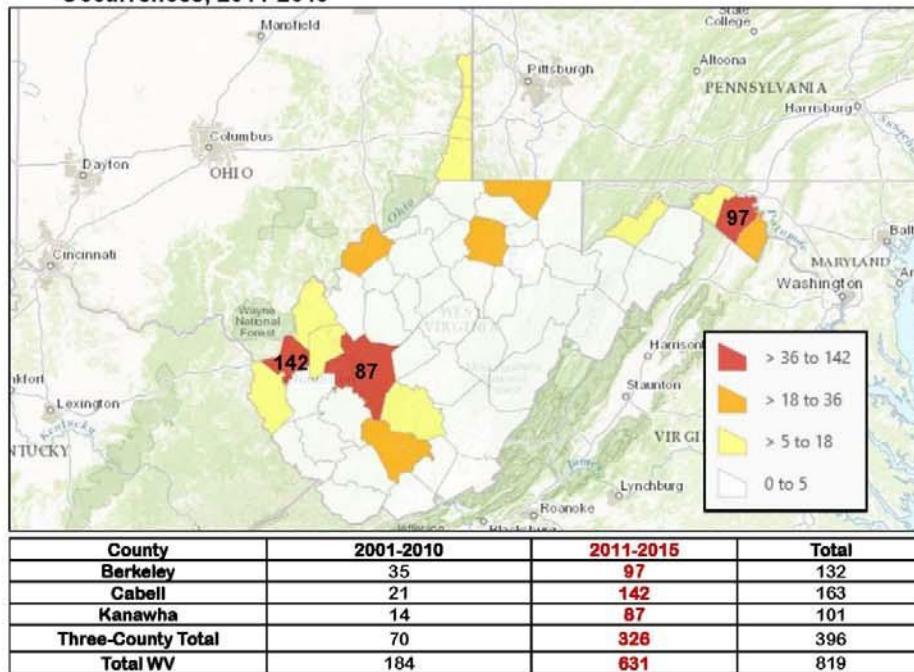
Figure 13: Heroin-Related Overdose Deaths, West Virginia Occurrences, 2001-2015 (N=819)



Data Source: WV Health Statistics Center, Vital Statistics System, 2015 Preliminary Data

631 heroin-related deaths occurred in the last five years from 2011-2015 (Figure 14), which is a 78% increase from the previous years (2001-2010) for these three counties. There were 3.4 times more heroin reported deaths over these five years than the previous ten years. 47% of deaths were reported from Berkeley, Cabell, and Kanawha counties. Cabell County had the highest rate of heroin-related overdose deaths in 2015 at 54.7 deaths per 100,000 people.

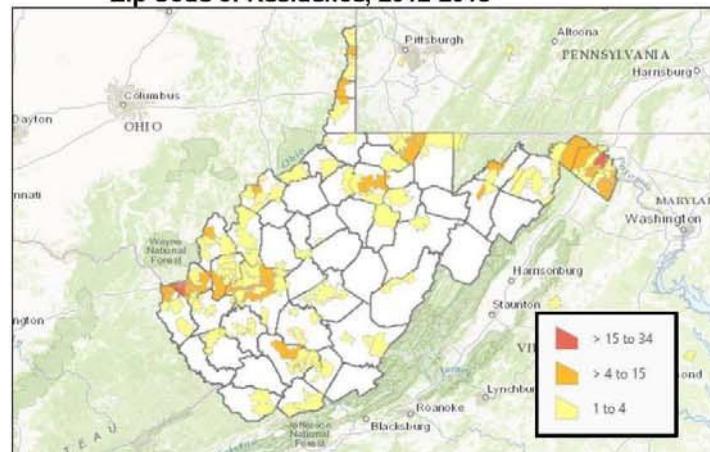
Figure 14: County-Level Distribution of Heroin-Related Overdose Death in West Virginia Occurrences, 2011-2015



Data Source: WV Health Statistics Center, Vital Statistics System, 2015 Preliminary Data

Figure 15 displays the heroin-related overdose deaths by zip code. These geographic distributions of data identify the targeted hot spots in red, followed by orange and yellow. This kind of detail by zip code can be used to target community intervention efforts.

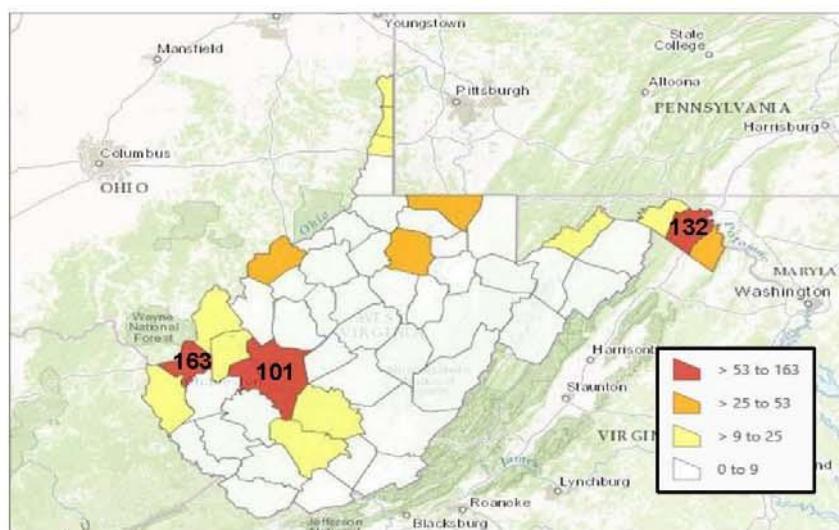
Figure 15: West Virginia Occurrence of Heroin Overdose Deaths by Zip Code of Residence, 2012-2015



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Figure 16 shows the county-level distribution of heroin-related overdose deaths from 2001 through 2015 with Cabell, Berkeley and Kanawha as the counties with the highest frequency of heroin-related overdose deaths.

Figure 16: County-Level Distribution of Heroin-Related Overdose Deaths West Virginia Occurrences, 2001-2015

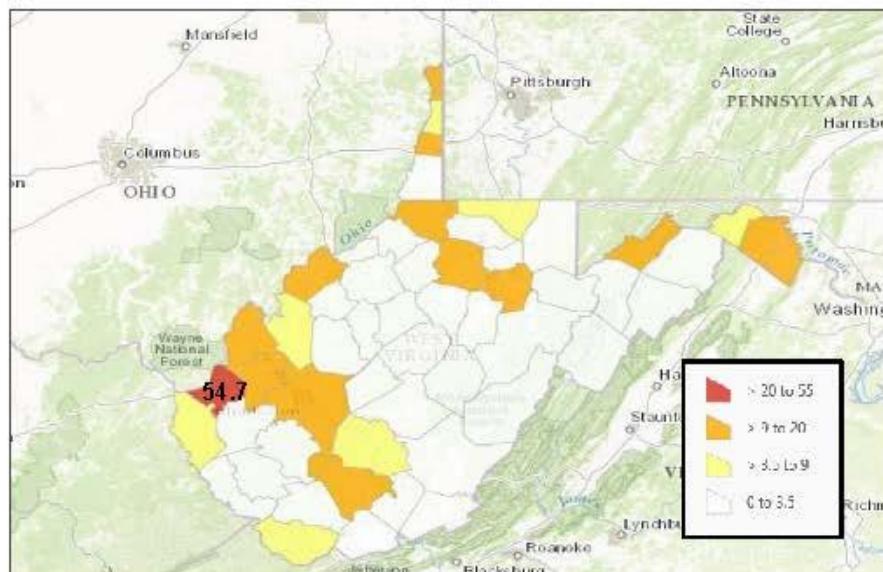


Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Cabell County had the highest death rate of heroin-related overdose deaths in 2015 at 54.7 deaths per 100,000 people (Figure 17). There are several other counties throughout the state with 9 to

20 heroin-related overdose deaths, so as this cause of death continues to occur in multiple counties, the concern statewide increases.

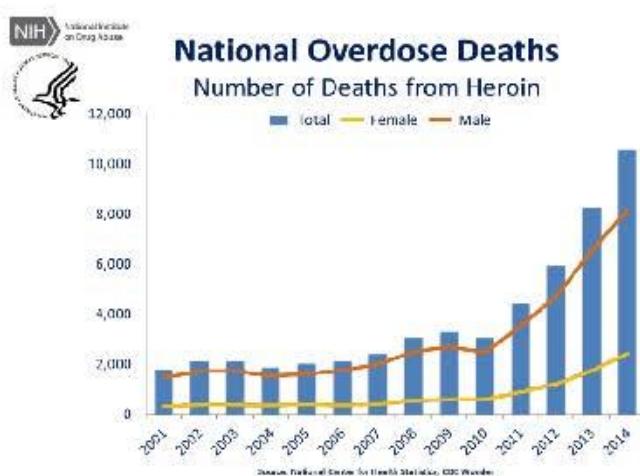
Figure 17: County-Level Heroin-Related Overdose Deaths West Virginia, 2015



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

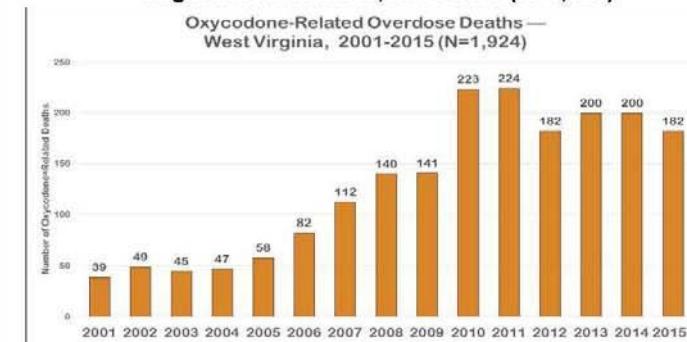
Nationally, a similar spike in documented heroin-related deaths was observed from 2011 through 2014 (Figure 18). Again, as is the case in West Virginia (Figure 13), there were more male heroin overdose deaths than females observed. The increase among males continues to grow since 2010. In 2011, West Virginia had the highest age-adjusted heroin-related death rate in the nation, well over twice the national rate and over a third higher than the next highest state, Kentucky.

Figure 18: U.S. Overdose Deaths from Heroin 2001-2014



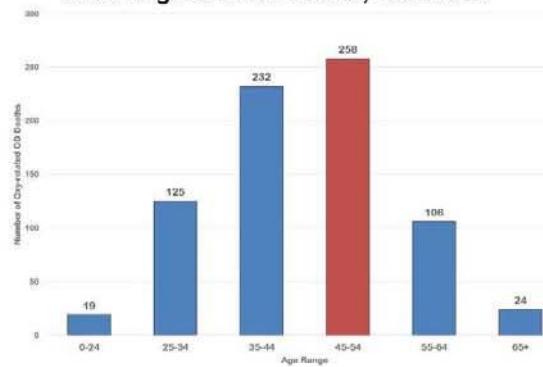
Oxycodone-related overdose deaths in West Virginia (Figure 19) were detected in 1,924 total deaths from 2001 through 2015. In Figure 19, there were two years, 2010 (223) and 2011 (224), that showed the peak for this drug causing overdose deaths in the state. The age range of 45-54 was detected as the peak age range for occurrence of oxycodone-related overdose deaths in 2012 through 2015, an older range than seen for other overdose deaths in this report (Figure 20).

Figure 19: Oxycodone-Related Overdose Deaths West Virginia Occurrences, 2001-2015 (N=1,924)



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

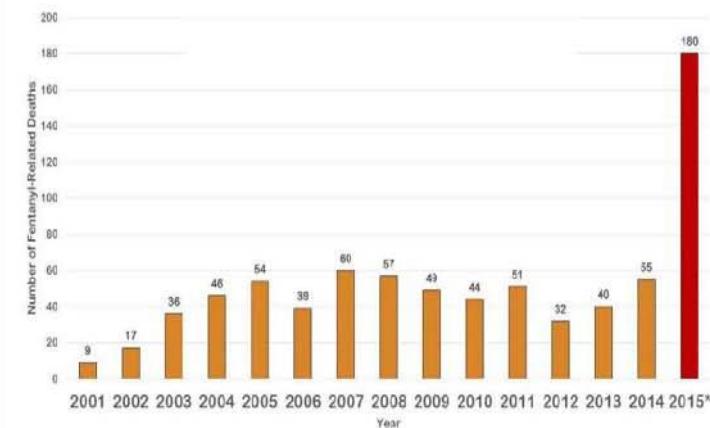
Figure 20: Oxycodone-Related Overdose Deaths by Age in West Virginia Occurrences, 2012-2015



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Another opioid analog, fentanyl, spiked in occurrence during 2015 drug overdose deaths (Figure 21) with 50% of 180 of the 358 deaths reported since 2011. A 227% increase occurred from 2014 (55 deaths) to 2015 (180 provisional death data).

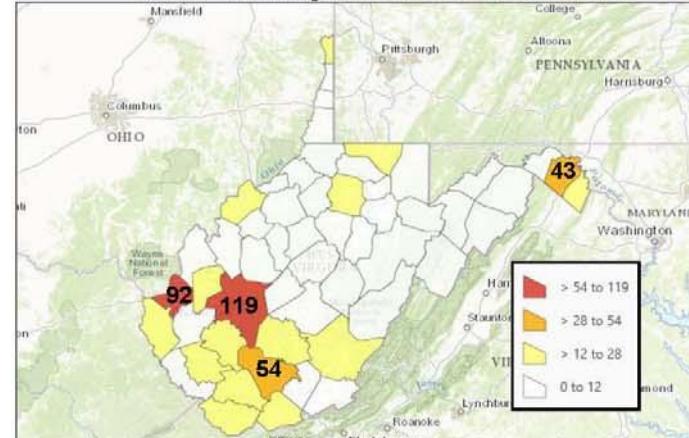
Figure 21: Fentanyl-Related Overdose Deaths West Virginia Occurrences, 2001-2015 (N=769)



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

The county-level distribution of fentanyl-related overdose deaths was also reported more in southern West Virginia counties as has become the pattern with much of West Virginia's overdose death epidemic. Both frequency and rates per 100,000 for fentanyl-related deaths were concentrated in the southern counties. 69% of fentanyl-related deaths from 2001 through 2015 were reported from Cabell and Kanawha counties (Figure 22). Raleigh County is not far behind where 54 fentanyl-related overdose deaths were detected.

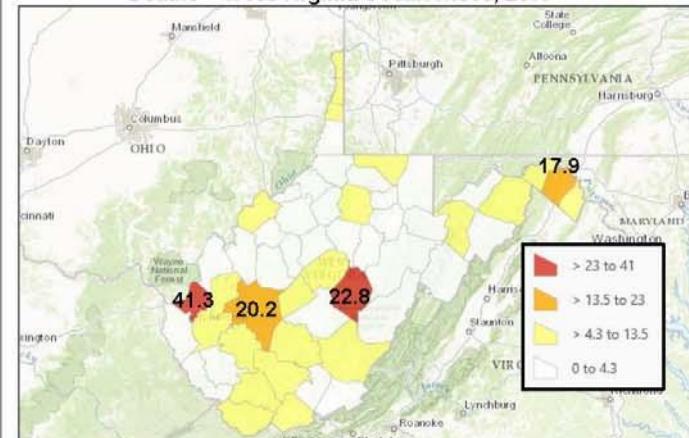
Figure 22: County-Level Distribution of Fentanyl-Related Overdose Deaths – West Virginia Occurrences, 2001-2015



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

In Figure 23, the data show that in 2015 there were 41% of fentanyl-related deaths in Cabell County, followed by 23% in Webster County, 20% in Kanawha County and 18% in Berkeley County.

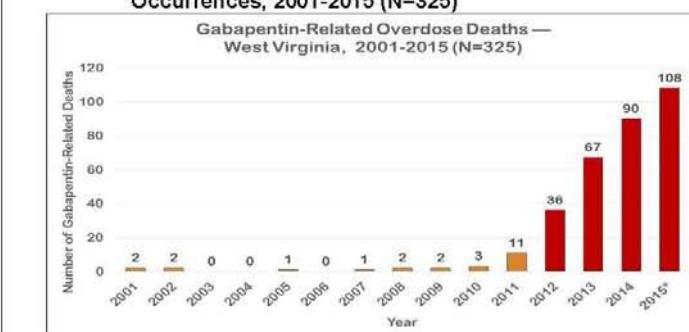
Figure 23: County-Level Incidence of Fentanyl-Related Overdose Deaths – West Virginia Occurrences, 2015



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Gabapentin is an anticonvulsant drug that has been used in the community of persons who use recreational drugs to potentiate the effects of other recreational drugs. Figure 24 provides this data from 2012 through 2015 indicating the need for attention to the steady increase of gabapentin-related overdose deaths. The last four years account for 93% of the total overdose deaths that detected gabapentin in toxicology results

Figure 24: Gabapentin-Related Overdose Deaths West Virginia Occurrences, 2001-2015 (N=325)



<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3404313/>

Thirty-five percent (35%) of gabapentin-related deaths from 2001 through 2015 were reported from three counties: Kanawha, Mercer, and Raleigh. Several other southwestern counties are identified in this alarming cluster.

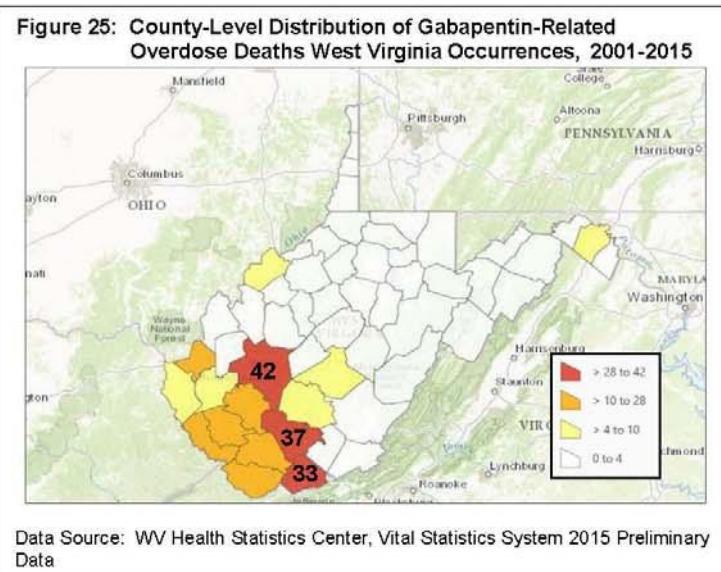


Figure 26 graphs the county incidence rates for gabapentin-related deaths. Lincoln, Boone, Logan, Wyoming and McDowell counties had the highest incidence rates of gabapentin-related deaths in 2015. These incidence rates further target the need for public health intervention in this area of the state.

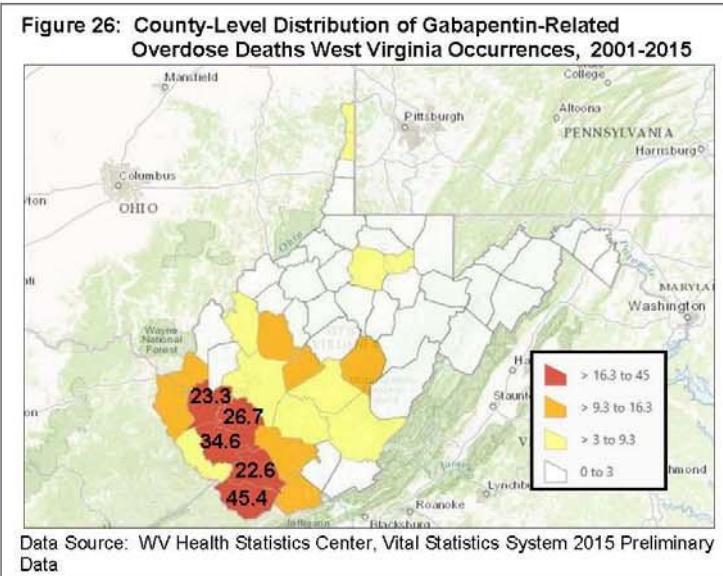


Table 2 displays the total number of 3,394 benzodiazepines (tranquillizers) by drug type from 2001 through 2015. Alprazolam accounted for 62% of the drug overdose deaths among benzodiazepines averaging about 216 deaths since 2011. Fifty percent (50%) of the three total drugs listed occurred among misuse of alprazolam from 2001 through 2015.

Table 2: Benzodiazepines by Drug Type in West Virginia Occurrences, 2001-2015

Drug	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Alprazolam	30	27	42	56	40	80	155	186	134	175	240	228	200	215	195	2114
Clonazepam	8	8	4	8	14	8	28	24	24	28	51	65	56	69	86	476
Diazepam	41	45	74	81	82	99	149	123	108	105	151	153	117	136	143	1607
At least 1 Benzo	72	73	111	126	124	168	269	279	224	277	367	343	308	343	330	3394

Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

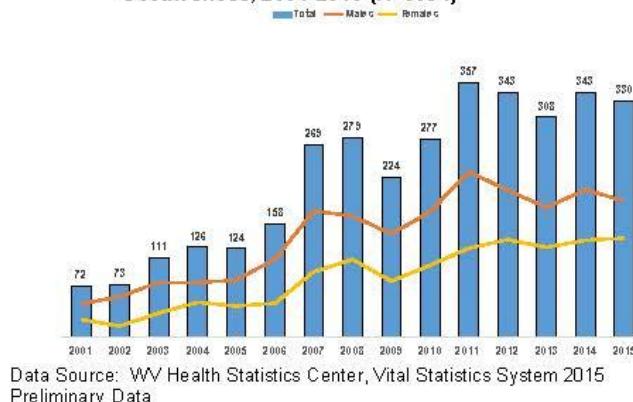
National overdose deaths from benzodiazepines peaked in 2011. After a slight decline in 2012, a new progressive increase from 2012 through 2014 is observed for both males and females in Figure 27.

Figure 27: National Benzodiazepines Overdose Deaths, 2001-2014



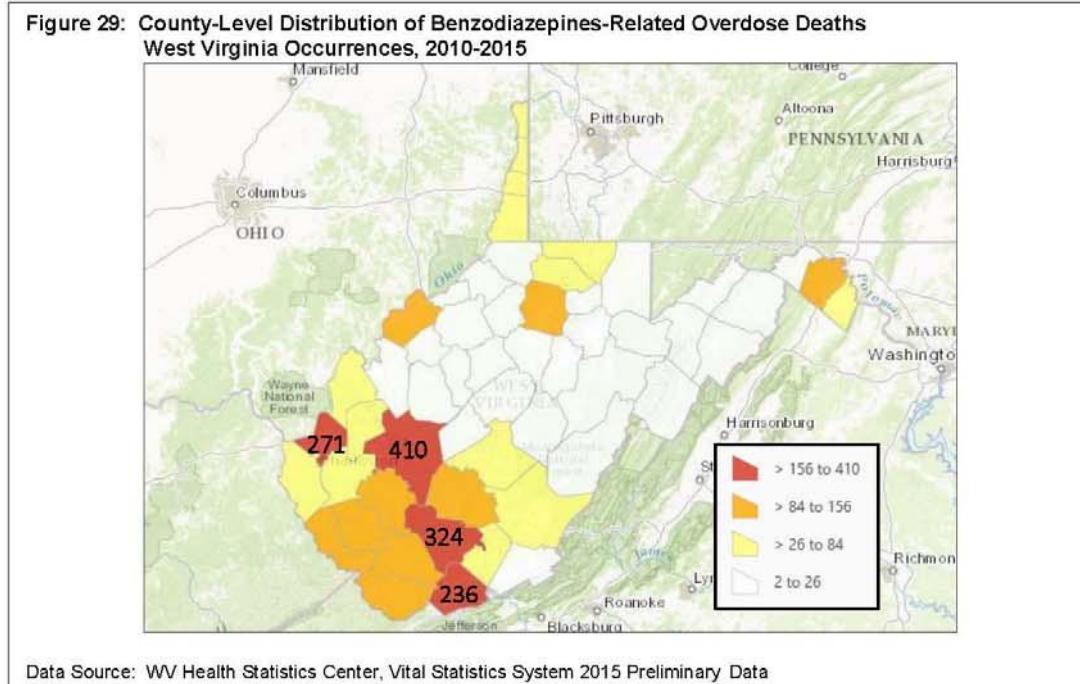
Figure 28 displays the most cases of benzodiazepine-related overdose deaths in 2011 (357) followed by a slight decline to 343 deaths in 2012, then a dip to 308 deaths in 2013. 2014 totals climb back to the level detected in 2012, then again a slight decline in 2014 to 330 deaths.

Figure 28: Benzodiazepine-Related Overdose Deaths West Virginia Occurrences, 2001-2015 (N=3394)



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Benzodiazepines overdose deaths detected in West Virginia from 2010 through 2015 primarily occurred in Kanawha, Raleigh, Cabell, and Mercer counties (Figure 29). The focus of these overdose deaths was mostly concentrated in the southwestern counties of the state.



Another group of drugs that are misused and detected with overdose deaths is called stimulants. This group includes amphetamines, cocaine, and methamphetamine. Table 3 lists a total of 1,257 stimulants detected from toxicology results over the last 15 years in West Virginia. Cocaine was detected in more deaths (1,059) than either amphetamines or methamphetamines from 2001 through 2015.

Table 3: Detected Stimulants in West Virginia Occurrence of Overdose Deaths (2001-2015)

Drug	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Total
Amphetamine	0	2	2	1	4	0	2	1	1	9	9	19	41	38	63	192
Cocaine	23	36	57	70	84	97	91	70	61	73	81	70	89	57	100	1059
Methamphetamine	1	0	0	1	4	2	4	2	3	9	8	11	23	21	49	138
At least 1 Stimulant	24	38	57	71	88	98	96	73	65	90	98	89	122	92	156	1257

Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Figure 30 displays data from 2001 through 2015 with a 69.6% increase of West Virginia stimulant overdose deaths in 2015 from the previous year of 2014. From 2001 through 2006/2007, there was a gradual increase, but since the dip to 73 deaths in 2008 the number of deaths went up and down until 2013 with 122 deaths.

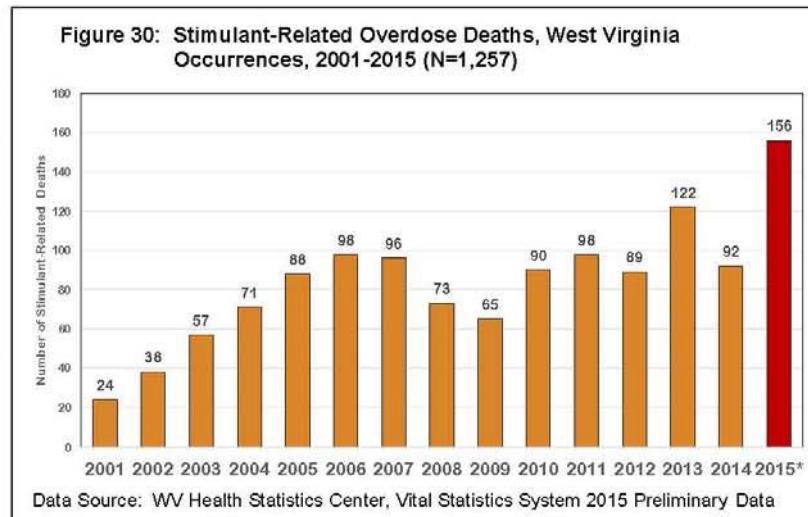
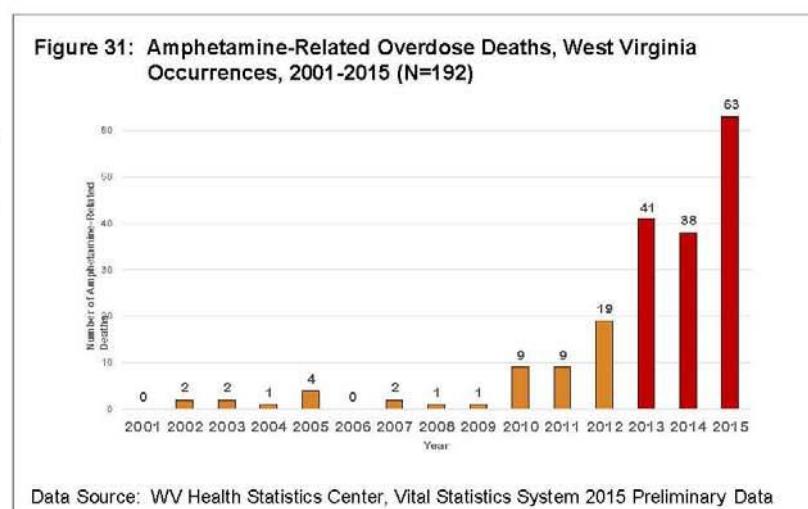
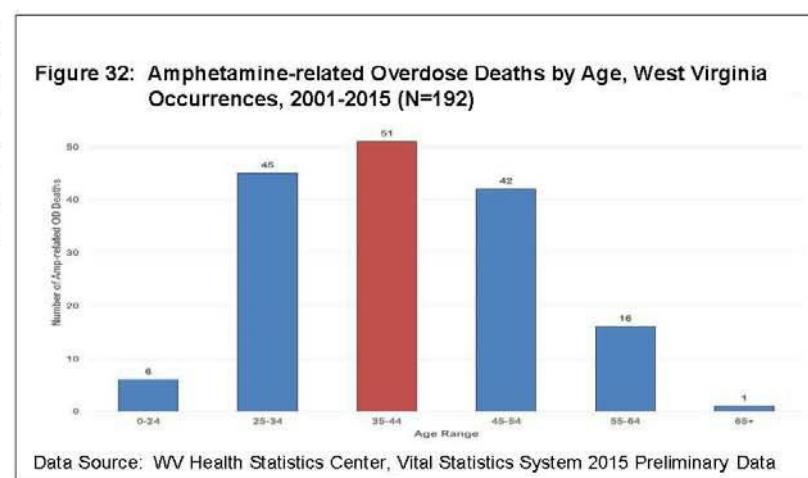


Figure 31 shows that 192 amphetamine-related overdose deaths were detected from 2001 through 2015, with 74% of the overdose deaths occurring in the last three years, 2013-2015.

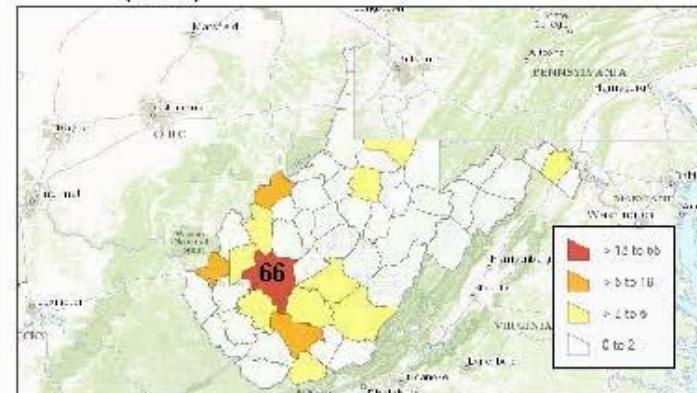


The 35-44 age range (Figure 32) accounted for 51 or 27% of these deaths followed by 45 or 23% among 25-34 year olds. Not far behind were 42 or 22% of overdose deaths due to amphetamines from 2001 through 2015.



Most of amphetamine-related overdose deaths over the last 15 years occurred in Kanawha County (66 of 192 or 34%). Cabell, Wood and Raleigh counties are next with 6 to 18 deaths due to amphetamines (Figure 33).

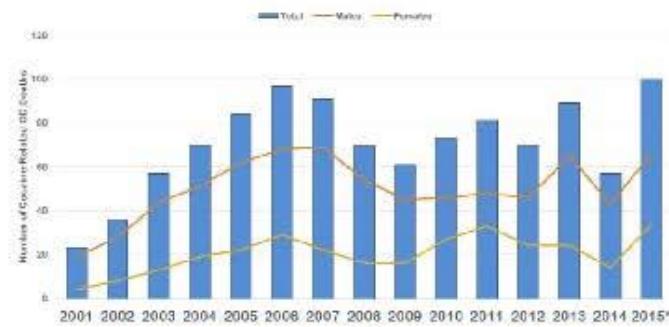
Figure 33: County-Level Distribution of Amphetamine-Related Overdose Deaths, West Virginia Occurrences, 2001-2015 (N=192)



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Cocaine was detected in 1,059 overdose deaths over the last 15 years with a peak in occurrence in 2006 and 2015 (Figure 34). From 2014 through 2015 a sharp total increase is observed for both males and females.

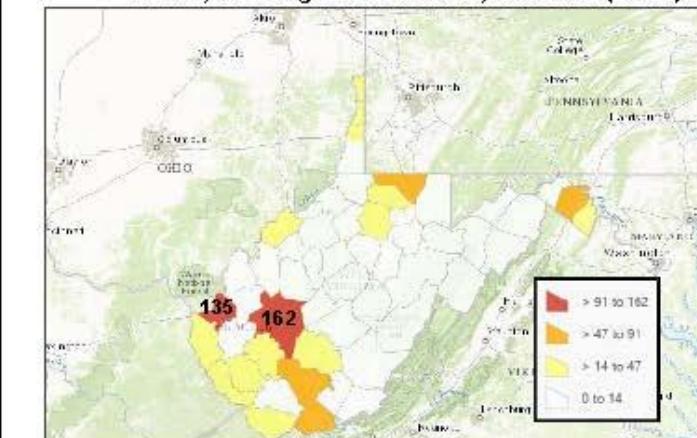
Figure 34: Cocaine-Related Overdose Deaths, West Virginia Occurrences (2001-2015) (N=1,059)



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Cocaine-related overdose death rates were mostly detected in Kanawha and Cabell counties (28%) in Figure 35. Other smaller populated counties are detected when figuring rates for these deaths as compared to Figure 33 above.

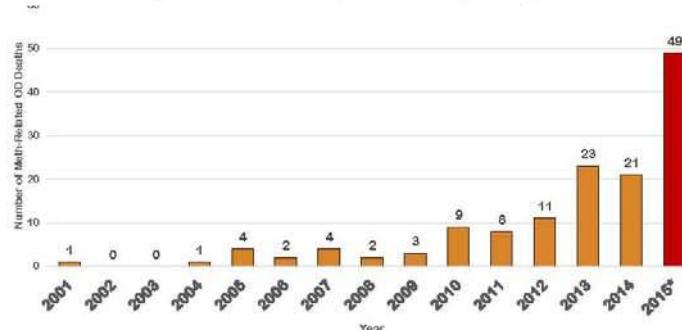
Figure 35: County-Level Distribution of Cocaine-Related Overdose Deaths, West Virginia Occurrences, 2001-2015 (N=192)



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

A spike in methamphetamine-related overdose deaths (38%) occurred in 2015 (Figure 36) which is a 133% increase from the previous year.

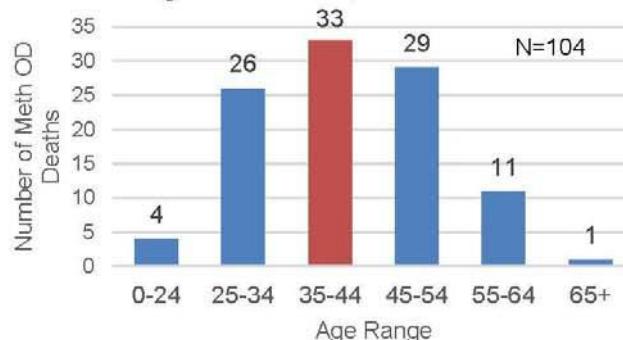
Figure 36: Methamphetamine (Meth)-Related Overdose Deaths, West Virginia Occurrences, 2001-2015 (N=128)



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Figure 37 shows that methamphetamine-related overdose deaths from 2012 through 2015 were mostly detected in the 35-44 age range. Most deaths by age range cluster in the 45-54 and 25-34 ages.

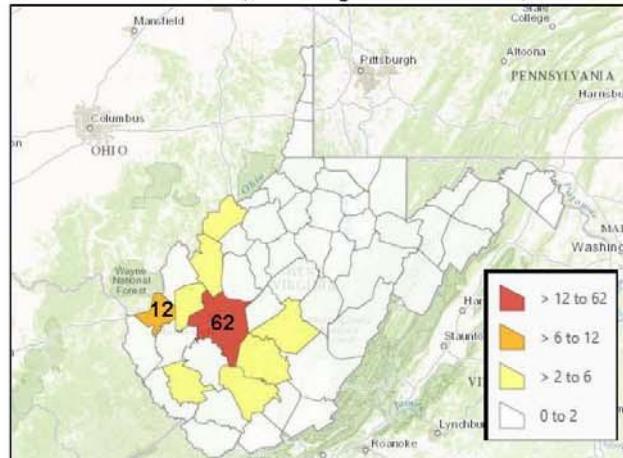
Figure 37: Methamphetamine (Meth)-Related Overdose Deaths by Age West Virginia Occurrences, 2012-2015



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

In Figure 38, Kanawha County had 62 of the 104, or 60% of the methamphetamine-related overdose deaths from 2001 through 2015.

Figure 38: County-Level Distribution of Methamphetamine-Related Overdose Deaths, West Virginia Occurrences, 2001-2015



Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Figure 39 shows only 2015 data for methamphetamine-related overdose deaths still occurring primarily in Kanawha County followed by Cabell County.

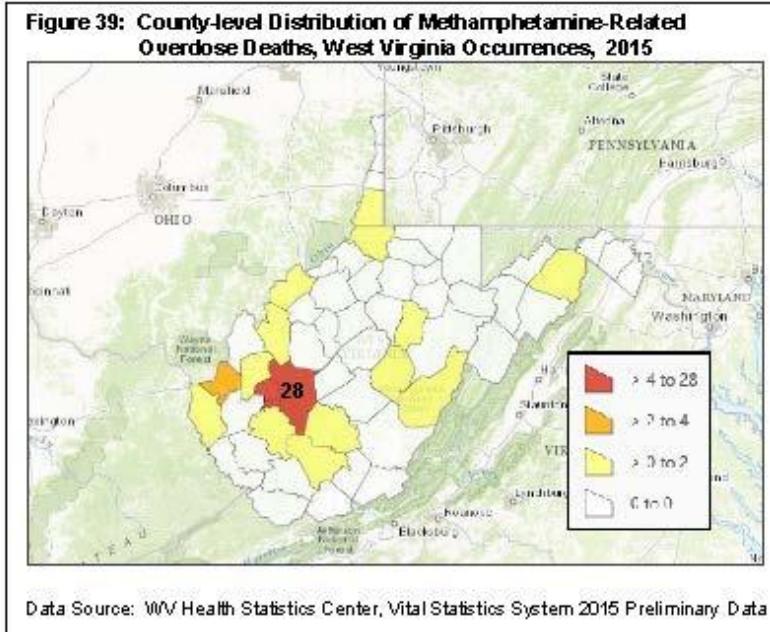
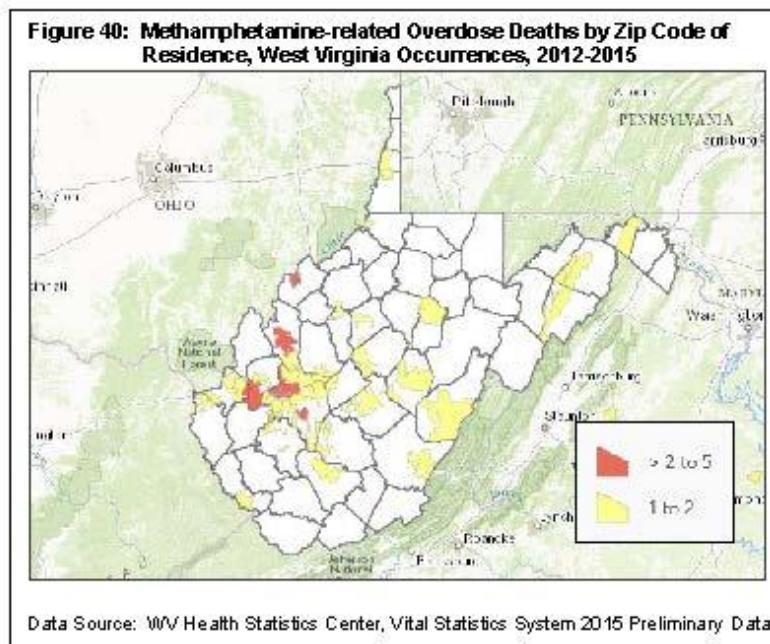


Figure 40 geographically displays methamphetamine-related overdose deaths by zip code for 2012 through 2015. Thus, the geographic distributions of data identify the targeted hot spots in red, followed by yellow. These data can be used to target community interventions for drug treatment and prevention efforts.



Tables 4 through 7 provide the data for total overdose deaths in 2012 through 2015 by race/ethnicity of the decedent. These overdose deaths among black/non-Hispanics increased 3-4 fold from 2014 to 2015, but the numbers are low for other race/ethnicity combinations (not considering white/non-Hispanic). Thus, there is not much interpretation for race/ethnicity since most overdose deaths whether they are due to opioids, benzodiazepines, or a death tied to one or more opioids or benzodiazepines since the occurrences are mostly among white/non-Hispanic decedents.

Table 4: West Virginia Occurrence Drug Overdose Deaths by Race/Ethnicity of Decedent, 2012-2015

Race/Ethnicity	Year				
	2012	2013	2014	2015	2012-2015
All Races	558	587	629	730	2,504
White/Non-Hispanic	536	555	610	677	2,378
Black/Non-Hispanic	19	26	16	52	113
Other	3	6	3	1	13

Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Table 5: West Virginia Occurrence Drug Overdose Deaths Containing One or More Opioids by Race/Ethnicity of Decedent, 2012-2015

Race/Ethnicity	Year				
	2012	2013	2014	2015	2012-2015
All Races	476	500	554	638	2,168
White/Non-Hispanic	462	476	540	596	2,074
Black/Non-Hispanic	12	19	11	41	83
Other	2	5	3	1	11

Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Table 6: West Virginia Occurrence Drug Overdose Deaths Containing One or More Benzodiazepines by Race/Ethnicity of Decedent, 2012-2015

Race/Ethnicity	Year				
	2012	2013	2014	2015	2012-2015
All Races	343	308	343	330	1,324
White/Non-Hispanic	338	298	339	316	1,291
Black/Non-Hispanic	4	6	4	13	27
Other	1	4	0	1	6

Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

Table 7: West Virginia Occurrence Drug Overdose Deaths Containing a Combination of One or More Opioids or One or More Benzodiazepines by Race/Ethnicity of Decedent, 2012-2015

Race/Ethnicity	Year				
	2012	2013	2014	2015	2012-2015
All Races	496	517	577	653	2,243
White/Non-Hispanic	482	493	563	610	2,148
Black/Non-Hispanic	12	18	11	42	83
Other	2	6	3	1	12

Data Source: WV Health Statistics Center, Vital Statistics System 2015 Preliminary Data

There are more public health issues to address related to the drug overdose problems in West Virginia. The state has also experienced a rise in infectious diseases like hepatitis B and C with reported risk factors related to the increasing use of the illicit drugs listed in this report. For example, in 2015, West Virginia reported 14.7 cases of acute hepatitis B (HBV) per 100,000 population (compared with the United States at <1 per 100,000 population). Many of the HBV cases were from the southern part of the state, between 25-49 years of age, and reported injection drug use, use of street drugs, etc. The acute hepatitis B infections rate has tripled in 6 years (from 4.7 in 2010 to 14.7 in 2015), and consistently the greatest two risk factors are injection drug use and any other drug use. Innovative public health intervention must take place not only to save lives among this at-risk population (with interventions such as naloxone dispensing for reversal of opioid-related overdose), but also to prevent morbidity of infectious disease burden such as with viral hepatitis in the same population. In 2015, there were 3.4 cases of acute hepatitis C (HVC) per 100,000 population in West Virginia (compared with the United States at <1 per 100,000 population). Similar to HBV, many of the HCV cases were from the southern counties in the state, and reported risk factors of injected drugs and street drugs among other risks, plus incarceration. Seventy-five percent (75%) of acute HCV cases reported between 2007 and 2015 were from patients between the ages of 20-39 (www.dide.wv.gov). The HSC reported opioid overdose deaths in 6,001 West Virginia citizens. Just like HBV and HCV, the burden of the county-level distribution of opioid-related overdose deaths lie in the southern part of the state.

What next steps can be taken to make a difference with these troubling problems? Former West Virginia Governor Earl Ray Tomblin announced that West Virginia has developed a plan that coincides with the CDC guidelines for prescribing opioids for chronic pain. The WVDHHR and Public Employees Insurance Agency (PEIA), in partnership with private insurers, pain specialists, pharmacists, and other healthcare providers, developed prior authorization requirements and an opioid treatment plan template for ongoing efforts to curb opioid misuse, overdoses, and deaths. Prior authorization forms were formally adopted January 2017.

"With more than 600 opiate-related deaths in West Virginia last year, we must continue making every positive change we can to break the cycle of addiction. These new guidelines will give physicians and patients the facts they need to make more informed decisions about treatment."

*Earl Ray Tomblin
Former Governor of West Virginia*

The CDC guidelines recommend that opioids should not be considered the first treatment of choice for pain management. The first choice for pain management treatment needs to include education for patients about and agree to all treatment decisions regarding chronic pain. They also recommend that providers consider potential opioid abuse – including diversion of opioid medication when pursuing treatment and take steps to prevent abuse.

To learn more about treatment options, refer to Chapter 4: Early Intervention, Treatment and Management of Substance Use Disorders in the US DHHS, Surgeon General's report, "*Facing Addiction in America: The Surgeon General's Report on Alcohol, Drugs and Health*" at <https://addiction.surgeongeneral.gov/>. Chapter 4 focuses on a spectrum of effective strategies and services to identify, treat, and manage substance use in mainstream healthcare including evidence-based medications, behavioral therapies, and supportive services.

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